11-5895-1078-10

TM 11-5895-1078-10

EQUIPMENT DESCRIPTION

OPERATOR'S CONTROLS

RADAR SURVEILLANCE SET, AN/APS-94F

NSN 5841-01-070-3859

This copy is a reprint which includes current pages from Change 1.

PMCS

OPERATION

OPERATOR'S MANUAL

D101.11:

HEADQUARTERS, DEPARTMENT OF THE ARMY OCTOBER 1981

WARNING

DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT

Be careful when working around the 115-volt ac line connections

DON'T TAKE CHANCES!

EXTREMELY DANGEROUS VOLTAGES EXIST IN THE FOLLOWING UNITS:

Receiver-Transmitter, Radar RT-1283/APS-94F	25,000 volts
Recorder-Processor-Viewer, Radar Mapping RO-495/U	10,000 volts
Generator, Sweep SG-1127/APS-94E	640 volts

ELECTROMAGNETIC RADIATION

DO NOT STAND ALONG SIDE OF ANTENNA
WHEN POWER IS ON!

PROPELLER DANGER

EXTREME DANGER FROM AIRCRAFT PROPELLERS.

Severe injury or death may result from coming in contact with rotating propellers.

ALWAYS KEEP CLEAR OF PROPELLER AREAS.

Use an auxiliary power unit (APU) to provide equipment power whenever possible.

DON'T TAKE CHANCES!

TM 11-5895-1078-10
C1

CHANGE

NO 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 1 June 1983

OPERATOR'S MANUAL
RADAR SURVEILLANCE SET AN/APS-94F
NSN 5841-01-070-3859

TM 11-5895-1078-10, 1 October 1981, is changed as follows:

1. New or changed material is indicated by a vertical bar in the margin of the page.
2. Added or revised illustration areas are indicated by a miniature pointing hand and a vertical bar in front of the figure caption.
3. Remove and insert pages as indicated below.

Remove	Insert
i and ii	i and ii
1-1 thru 1-4	1-1 thru 1-4
1-19 and 1-20	1-19 and 1-20
1-23 and 1-24	1-23 and 1-24
2-3 and 2-4	2-3 and 2-4
2-17 and 2-18	2-17 and 2-18
2-21 and 2-22	2-21 and 2-22
2-45 and 2-46	2-45 and 2-46
3-1	3-1/(3-2 blank)
A-1	A-1/(A-2 blank)
Index 1 and Index 2	Index 1 and Index 2

4. File this sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army :

E.C. MEYER
General, United State
Chief of Staff

Official :
ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

Distribution :

To be distributed in accordance with DA Form 12-36, Org
tional Maintenance requirements for AN/APS-94.

TECHNICAL MANUAL

TM 11-5895-1078-10

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 1 October 1981

OPERATOR'S MANUAL
RADAR SURVEILLANCE SET AN/APS-94F
NSN 5841-01-070-3859

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703.

In either case, a reply will be furnished direct to you.

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- Section II. Equipment Description 1-4
- Section III. Technical Principles of Operation 1-26

CHAPTER 2. OPERATING INSTRUCTIONS 2-0
- Section I. Description and Use of Operator's Controls and Indicators 2-1
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HOW TO USE THIS MANUAL

This is a dual purpose manual. It is intended for use as a training manual and as an operator's manual.

AS A TRAINING MANUAL

① Study chapter 1 carefully. You will gain a good basic understanding of the SLAR and of radar mapping.

② Study the description and use of SLAR controls and indicators (Chap. 2, Sect. 1). Ask your on-the-job-training (OJT) supervisor to go over each control with you.

③ Study the PMCS table and operator instruction sections. Follow the instructions of your OJT supervisor.

AS AN OPERATOR'S MANUAL

New Operator. All procedures are explained in detail. If you have very little experience with the SLAR you will still be able to operate it safely and effectively.

① Review description of SLAR controls and indicators (Chap. 2, Sect. 1).

② Perform PMCS — Chapter 2, Section II.

③ Follow detailed operating procedures in Chapter 2, Sections III and IV.

Experienced Operator. Essential parts of the procedures are highlighted by underlining. This will enable you to scan the instructions quickly and pick out the information you need.

① Perform PMCS — Chapter 2, Section II.

② Perform highlighted operating instructions in Chapter 2, Sections III and IV.

CHAPTER 1

INTRODUCTION

SECTION 1. GENERAL INFORMATION

SCOPE

This manual tells you how to operate Radar Surveillance Set AN/APS-94F, a Side Looking Airborne Radar (SLAR). It also describes the basic functioning of the SLAR and explains the radar maps that are produced.

All procedures are explained in detail to enable you to operate the SLAR safely and effectively.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR'S)

If your SLAR needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703. We'll send you a reply.

MAINTENANCE FORMS AND RECORDS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, the Army Maintenance Management System (TAMMS).

When your SLAR needs maintenance, write it up on Maintenance Request form 2407. Use a good ballpoint and press hard — you are making 5 copies.

Consolidated Index of Army Publications and Blank Forms.

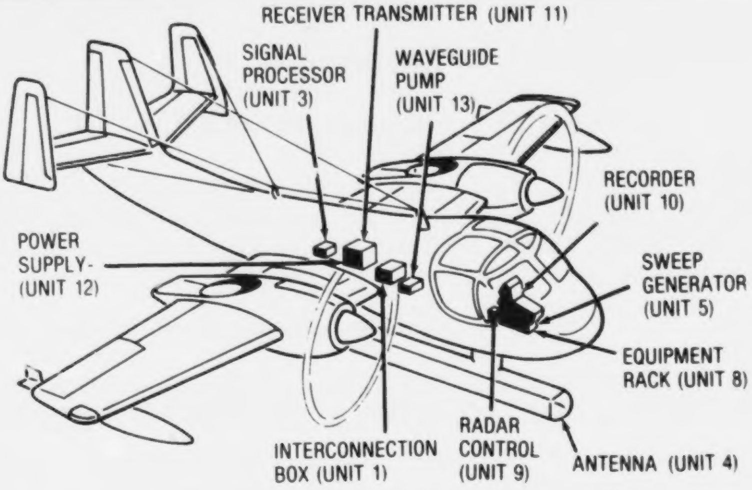
Refer to the latest issue of DA Pam 310-1 to determine whether there are new editions, changes or additional publications pertaining to the equipment.

ADMINISTRATIVE STORAGE

Before storing the equipment, verify its operational status by performing the operator's Preventive Maintenance Checks and Services. If defects are noted in the equipment, refer it to higher category maintenance.

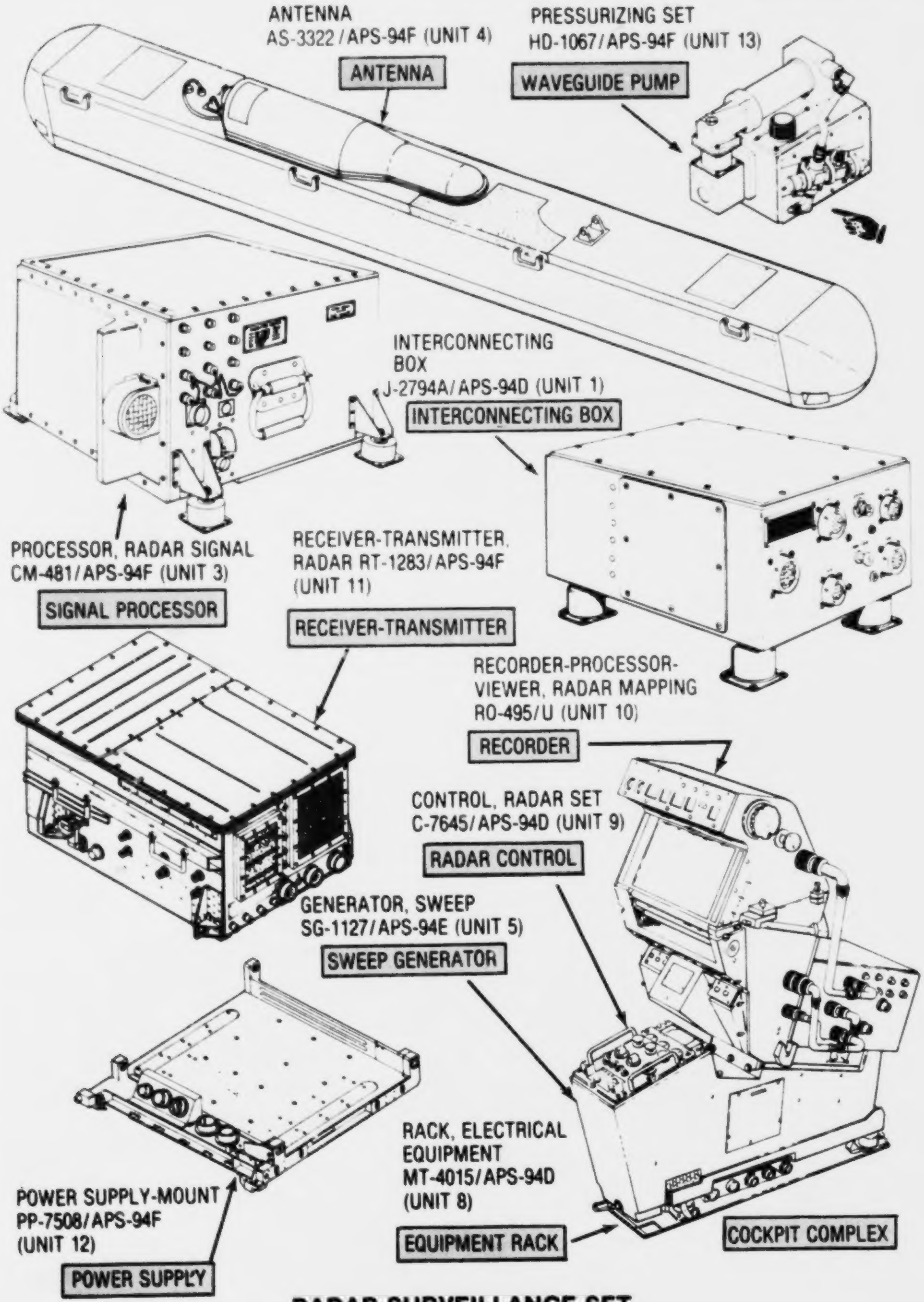
DESTRUCTION OF ARMY ELECTRONIC MATERIEL

Destruction of Army electronic materiel to prevent enemy use shall be in accordance with TM 750-244-2.


RECEIVER TRANSMITTER (UNIT 11)
SIGNAL PROCESSOR (UNIT 3)
WAVEGUIDE PUMP (UNIT 13)
RECORDER (UNIT 10)
SWEEP GENERATOR (UNIT 5)
POWER SUPPLY-(UNIT 12)
EQUIPMENT RACK (UNIT 8)
RADAR CONTROL (UNIT 9)
INTERCONNECTION BOX (UNIT 1)
ANTENNA (UNIT 4)

NOMENCLATURE CROSS REFERENCE LIST

Official Nomenclature	Common Name
Radar Surveillance Set, AN/APS-94F	SLAR
Recorder-Processor-Viewer, Radar Mapping, RO-495/U (Unit 10)	Recorder
Control, Radar Set C-7645/APS-94D (Unit 9)	Radar Control
Generator, Sweep SG1127/APS-94E (Unit 5)	Sweep Generator
Rack, Electrical Equipment MT-4015/APS-94D (Unit 8)	Equipment Rack
Interconnecting Box J-2794A/APS-94D (Unit 1)	Interconnecting Box
Processor, Radar Signal CM-481/APS-94F (Unit 3)	Signal Processor
Receiver-Transmitter, Radar RT-1283/APS-94F (Unit 11)	Receiver-Transmitter
Power Supply-Mount PP-7508/APS-94F (Unit 12)	Power-Supply
Antenna AS-3322/APS-94F (Unit 4)	Antenna
Pressurizing Set HD-1067/APS-94F (Unit 13)	Waveguide Pump


ANTENNA
AS-3322/APS-94F (UNIT 4)
ANTENNA
PRESSURIZING SET
HD-1067/APS-94F (UNIT 13)
WAVEGUIDE PUMP
INTERCONNECTING
BOX
J-2794A/APS-94D (UNIT 1)
INTERCONNECTING BOX
PROCESSOR, RADAR SIGNAL
CM-481/APS-94F (UNIT 3)
SIGNAL PROCESSOR
RECEIVER-TRANSMITTER,
RADAR RT-1283/APS-94F
(UNIT 11)
RECEIVER-TRANSMITTER
RECORDER-PROCESSOR-
VIEWER, RADAR MAPPING
RO-495/U (UNIT 10)
RECORDER
CONTROL, RADAR SET
C-7645/APS-94D (UNIT 9)
RADAR CONTROL
GENERATOR, SWEEP
SG-1127/APS-94E (UNIT 5)
SWEEP GENERATOR
RACK, ELECTRICAL
EQUIPMENT
MT-4015/APS-94D
(UNIT 8)
EQUIPMENT RACK
COCKPIT COMPLEX
POWER SUPPLY-MOUNT
PP-7508/APS-94F
(UNIT 12)
POWER SUPPLY

RADAR SURVEILLANCE SET AN/APS-94F. SLAR

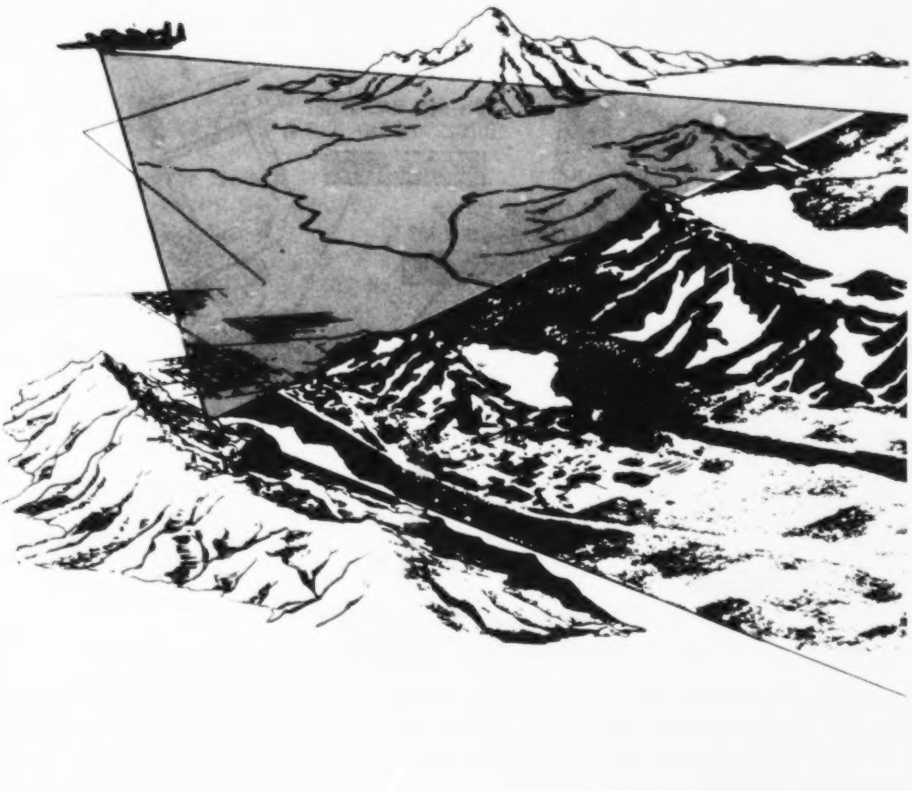
These components make up Radar Surveillance Set, AN/APS-94F. The common name for each unit is shown highlighted following the nomenclature and unit number. Common names will be used when referring to the components throughout this manual.

SECTION II

EQUIPMENT DESCRIPTION
PURPOSE, CAPABILITIES AND FEATURES

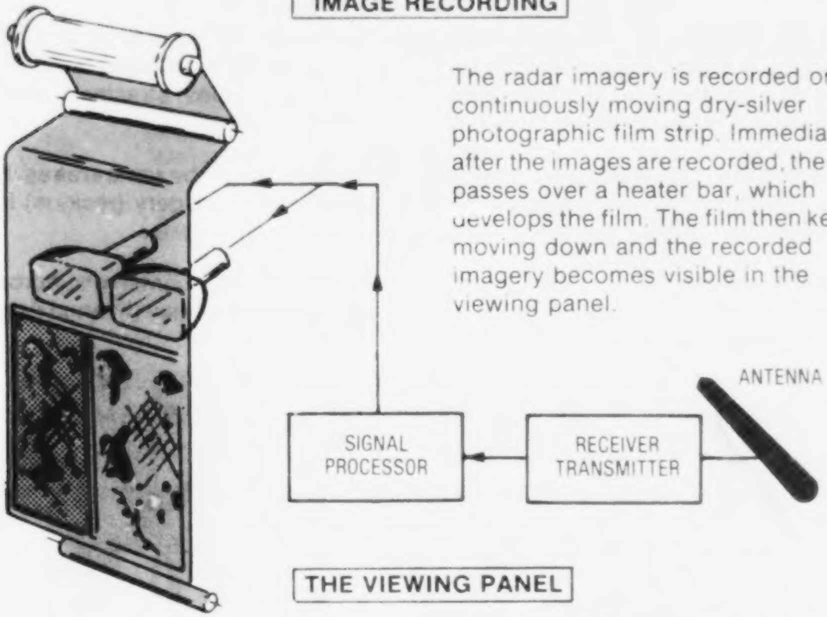
PURPOSE AND USE

Radar Surveillance Set AN/APS-94F is a side-looking airborne radar (SLAR). It produces permanent radar maps (radar imagery filmstrips) of terrain to either or both sides of the aircraft flightpath. These maps are interpreted by military intelligence personnel for the purpose of discovering moving targets, and maintaining surveillance on other objects and features of military importance. The maps also provide battlefield commanders with information on troop movements, road and airfield construction, etc.



CAPABILITIES AND FEATURES

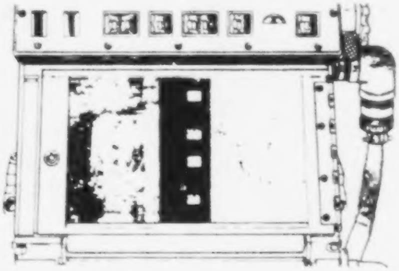
IMAGE RECORDING



The radar imagery is recorded on a continuously moving dry-silver photographic film strip. Immediately after the images are recorded, the film passes over a heater bar, which develops the film. The film then keeps moving down and the recorded imagery becomes visible in the viewing panel.

THE VIEWING PANEL

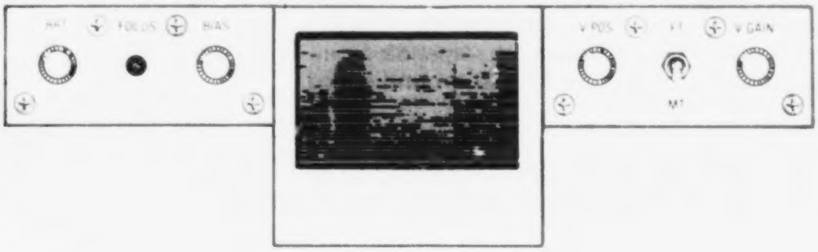
A film viewing panel is on the front of the SLAR recorder in the cockpit. It allows you to see the completely processed film during the mission within a few minutes after the radar images are recorded.



THE MONITOR SCOPE

The monitor scope enables you to see the radar video signal at the time it is being received and recorded. A panoramic display of the frequency band used by the SLAR is also provided. This display will allow you to retune the SLAR to avoid interference from other transmitters.

The monitor scope also provides several displays used by maintenance personnel to align the SLAR.

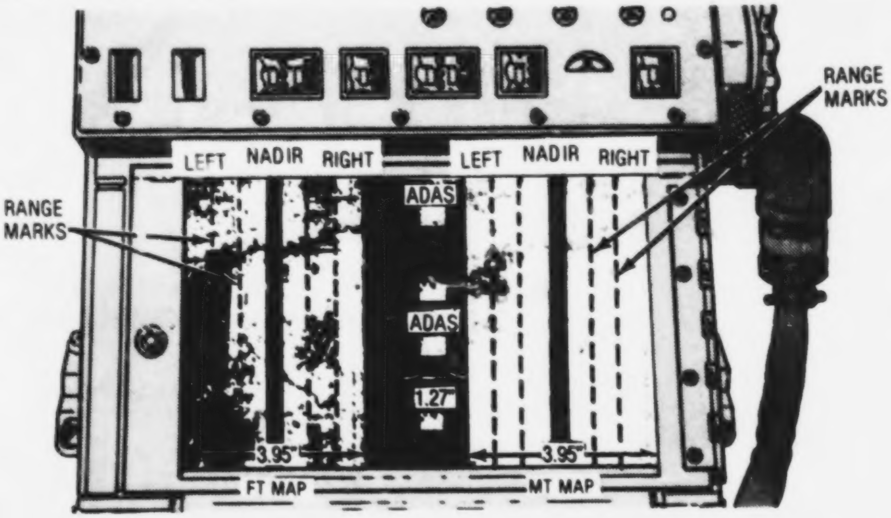


THE RADAR MAP AND FILM STRIP

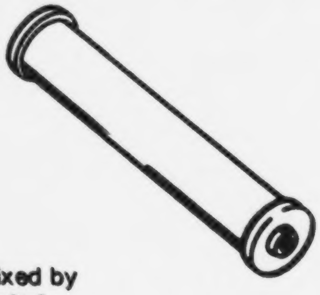
The SLAR produces two separate maps, side-by-side on the same film strip. The map on the left side, as seen at the recorder viewing panel, is the fixed target (ft) map. This map contains all of the radar imagery — mountains, streams, roads, buildings, and other features.

The map on the right side is the moving target (mt) map. It is of the same area as the ft map, but shows moving objects on the ground. Some ft imagery (residue) is present on the mt map to make it easier to locate moving targets.

Range marks are of 30 seconds duration and occur at 60 second intervals. Across the film, range marks appear at 20 KM intervals after the range delay (if range delay is 30, first range mark is 50).



The filmstrip used to record radar imagery is 9.46 inches wide. This includes a margin on each edge of about one-fourth inch. Each radar map (FT and MT) is 3.95 inches wide. A 1.27 inch strip between the FT and MT maps is used to print airborne data annotation system (ADAS) data blocks. The ADAS data blocks are generated by Airborne Data Annotation System, AN/AYA-10. They contain coded navigational data.

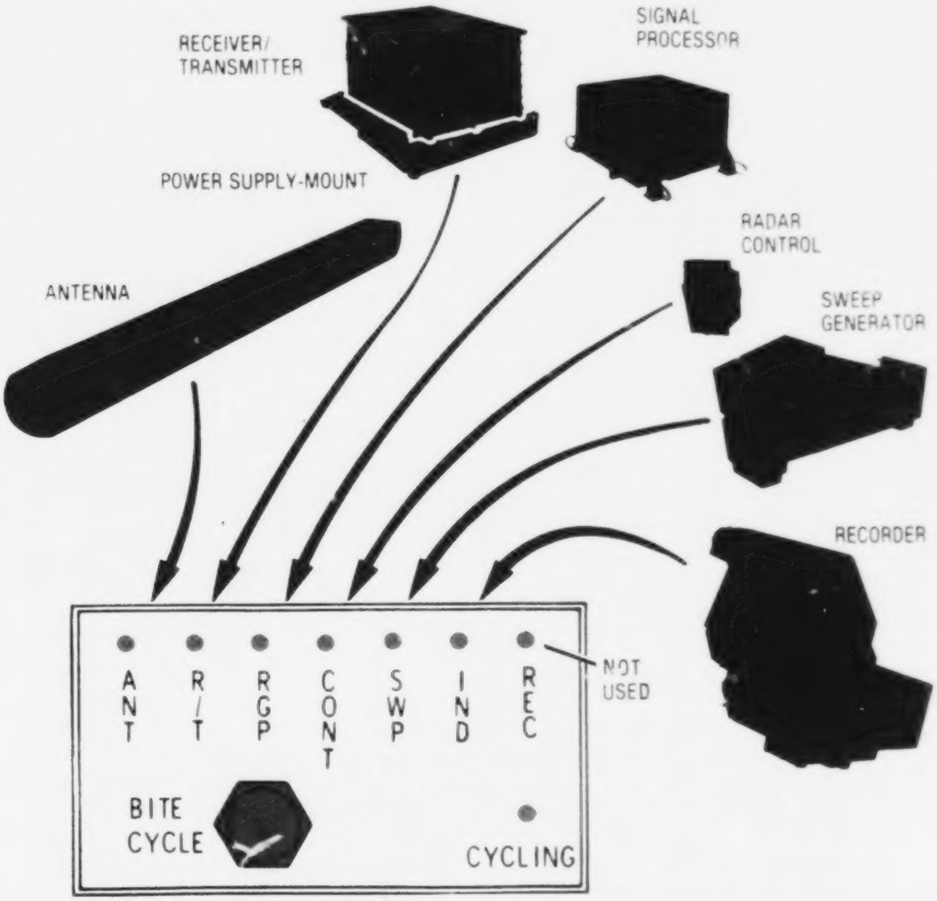


The radar map film is packaged in 50-foot lengths in expendable cassettes. Each cassette allows from 7 to 100 hours of recording depending on SLAR control settings and aircraft ground speed.

The film type is dry silver, which is developed and fixed by heat. No film developing or fixing chemicals are needed.

CAPABILITIES AND FEATURES (Continued)

BUILT-IN TEST EQUIPMENT SYSTEM (BITE)


RECEIVER/
TRANSMITTER
SIGNAL
PROCESSOR
POWER SUPPLY-MOUNT
RADAR
CONTROL
ANTENNA
SWEEP
GENERATOR
RECORDER
ANT
R/T
RGP
CONT
SWP
IND
REC
NOT
USED
BITE
CYCLE
CYCLING

The BITE system continuously monitors important signals throughout the SLAR. This gives you the status of significant system functions anytime the SLAR is in operation. The BITE indicators are on the radar control panel. When a failure occurs, the BITE indicator for that function blinks white and black alternately. The BITE CYCLE pushbutton will be used during the preflight check to set up the SLAR.

ELECTRONIC COUNTER-COUNTERMEASURES (ECCM)

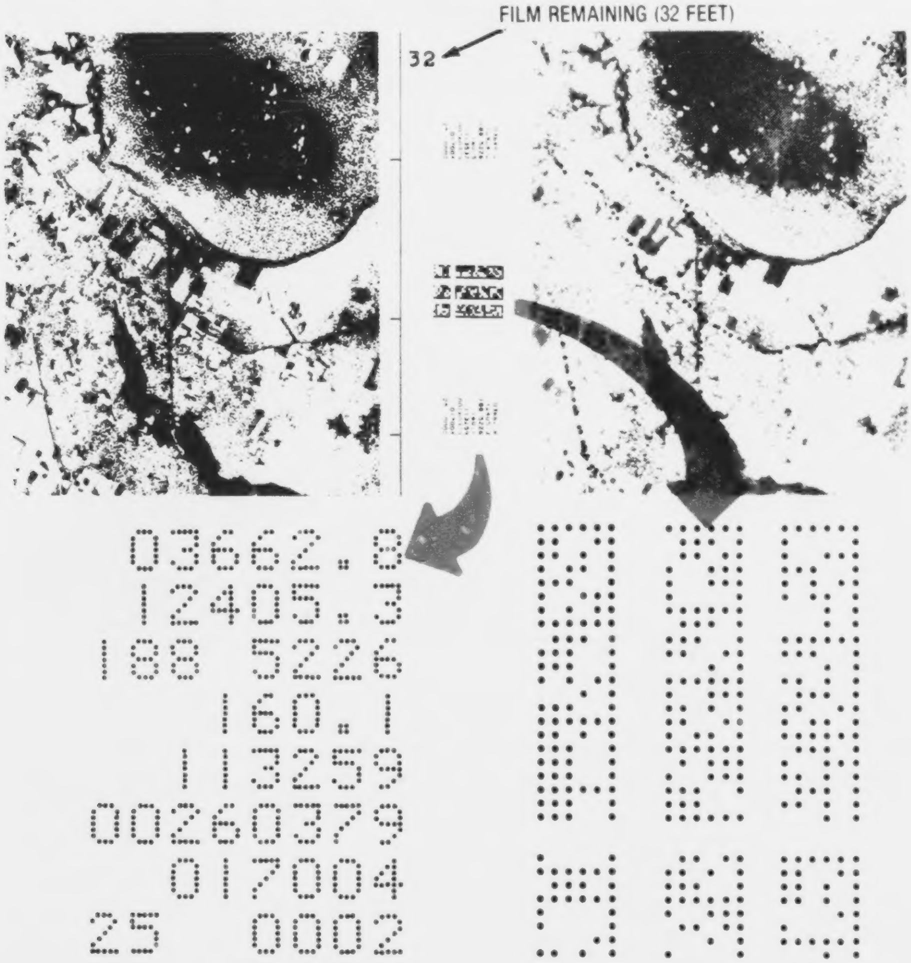
The SLAR contains electronic counter-countermeasures (ECCM) circuits. These are circuits which prevent signals from other transmitters from interfering with the SLAR. ECCM circuits are automatic — you don't have to do anything to make them work. However, as you operate the SLAR, you can help ECCM to work better by selecting a frequency that is not near the interfering signals.

CAPABILITIES AND FEATURES (Continued)

AIRBORNE DATA ANNOTATION SYSTEM (ADAS)

ADAS data blocks contain the date, time, aircraft number, sortie number, aircraft ground speed and altitude, and location of the aircraft at the time the data block is printed. SLAR RANGE and DELAY settings are also shown. The ADAS data blocks appear on the radar map film strip. They are located in the clear area between the mt and ft maps.

The clear area also has numbers that show how much film is left on the cassette.



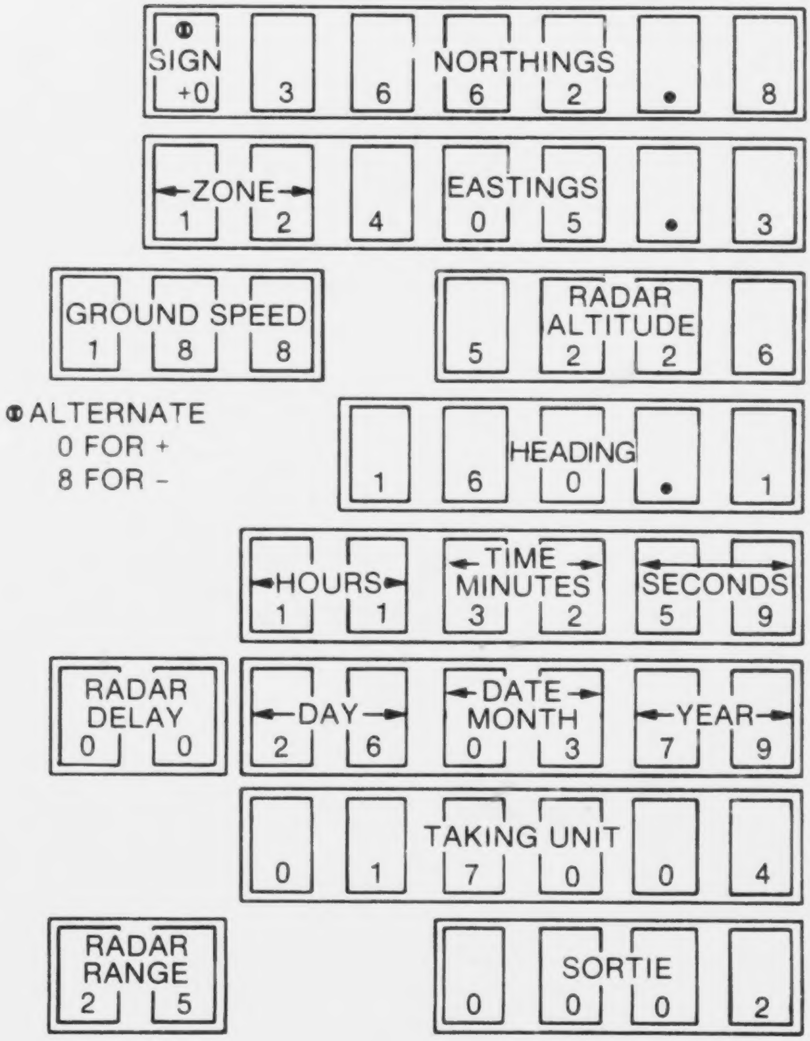
Numerical ADAS

BCD ADAS

There are two kinds of ADAS blocks, numerical and BCD (binary-coded decimal). Numerical ADAS blocks contain the information on the facing page and are printed in Arabic numbers. BCD ADAS blocks present information in a dot pattern and must be interpreted. Since the BCD ADAS blocks use less space for each bit of information, they contain more data than the numerical ADAS blocks.

AIRBORNE DATA ANNOTATION SYSTEM (ADAS)

AN/APS-94F NUMERIC DATA BLOCK

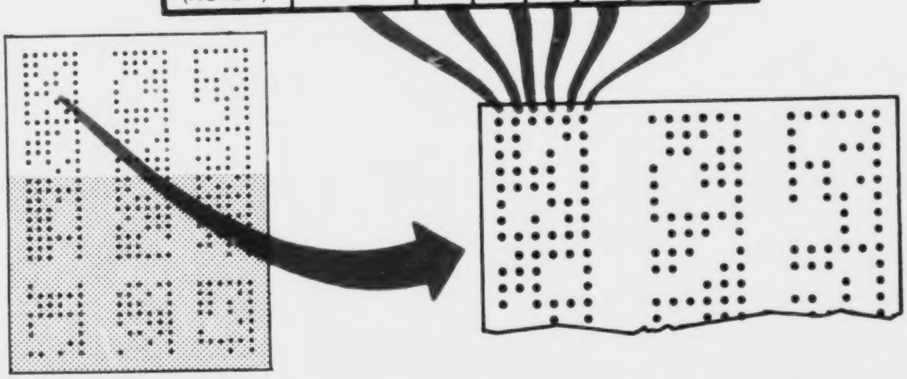

① SIGN +0
3
6
NORTHINGS
6
2
•
8
ZONE
1
2
4
EASTINGS
0
5
•
3
GROUND SPEED
1
8
8
5
RADAR ALTITUDE
2
2
6
① ALTERNATE
0 FOR +
8 FOR –
1
6
HEADING
0
•
1
TIME
HOURS
1
1
MINUTES
3
2
SECONDS
5
9
RADAR DELAY
0
0
DATE
DAY
2
6
MONTH
0
3
YEAR
7
9
0
1
TAKING UNIT
7
0
0
4
RADAR RANGE
2
5
0
SORTIE
0
0
2

CAPABILITIES AND FEATURES (Continued)

AIRBORNE DATA ANNOTATION SYSTEM (ADAS)

READING BCD ADAS

NUMERIC VALUE OR MEANING	PARITY COLUMN (NOTE 1)	DATA COLUMN (NOTE 2)				INDEX COLUMN (NOTE 3)
		D1	D2	D3	D4	
		1	2	4	8	
0	●	●	●			●
1				●		●
2	●	●		●		●
3	●		●	●		●
4		●	●	●		●
5					●	●
6	●	●			●	●
7	●		●		●	●
8		●	●		●	●
9	●			●	●	●
+	●	●		●	●	●
-		●				●
DIVIDER (NOTE 4)	●	●	●	●	●	●

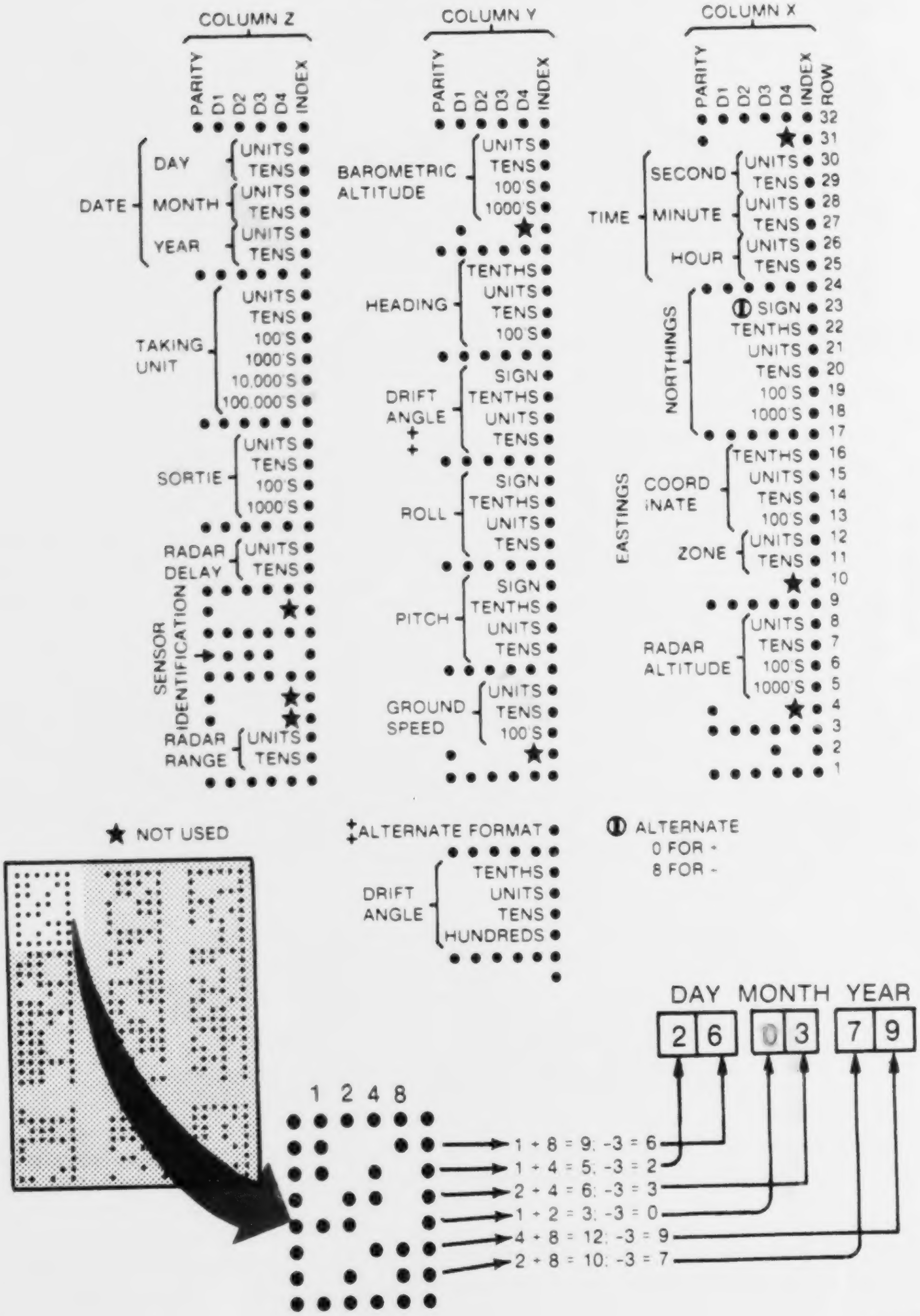


1. THE PARITY BIT IS PRESENT TO CAUSE THE TOTAL COUNT OF DOTS ACROSS ONE COLUMN TO BE AN EVEN NUMBER. THIS PROVIDES THE "ODD PARITY CHECK" TO INSURE THAT THE BIT RECORDING IS CORRECT.
2. THE DATA MATRIX IS CODED IN "EXCESS THREE" BINARY CODED DECIMAL. READ AS NORMAL BINARY SYSTEM AND SUBTRACT THREE.
3. THE INDEX MARK IS ALWAYS PRESENT.
4. THE DIVIDER SEPARATES MAJOR GROUPS OF CHARACTERS.

CAPABILITIES AND FEATURES (Continued)

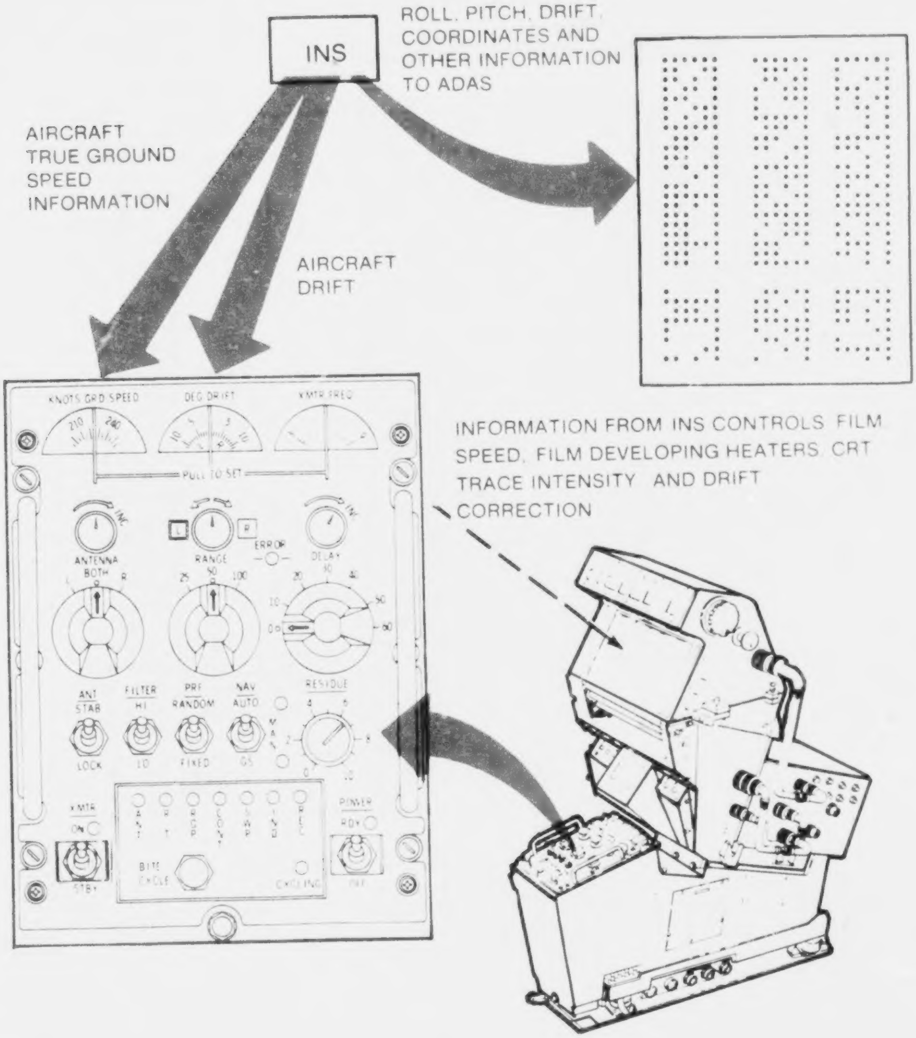
AIRBORNE DATA ANNOTATION SYSTEM (ADAS)

READING BCD ADAS


COLUMN Z
PARITY D1 D2 D3 D4 INDEX
DATE
DAY UNITS TENS
MONTH UNITS TENS
YEAR UNITS TENS
TAKING UNIT
UNITS TENS 100'S 1000'S 10,000'S 100,000'S
SORTIE
UNITS TENS 100'S 1000'S
RADAR DELAY UNITS TENS
SENSOR IDENTIFICATION
RADAR RANGE UNITS TENS
COLUMN Y
PARITY D1 D2 D3 D4 INDEX
BAROMETRIC ALTITUDE
UNITS TENS 100'S 1000'S
HEADING
TENTHS UNITS TENS 100'S
DRIFT ANGLE ‡
SIGN TENTHS UNITS TENS
ROLL
SIGN TENTHS UNITS TENS
PITCH
SIGN TENTHS UNITS TENS
GROUND SPEED
UNITS TENS 100'S
COLUMN X
PARITY D1 D2 D3 D4 INDEX ROW
TIME
SECOND UNITS TENS
MINUTE UNITS TENS
HOUR UNITS TENS
NORTHINGS
① SIGN TENTHS UNITS TENS 100'S 1000'S
EASTINGS
COORD INATE
TENTHS UNITS TENS 100'S
ZONE UNITS TENS
RADAR ALTITUDE
UNITS TENS 100'S 1000'S
32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
★ NOT USED
‡ ALTERNATE FORMAT
DRIFT ANGLE
TENTHS UNITS TENS HUNDREDS
① ALTERNATE
0 FOR +
8 FOR -
DAY MONTH YEAR
2 6 0 3 7 9
1 2 4 8
1 + 8 = 9; -3 = 6
1 + 4 = 5; -3 = 2
2 + 4 = 6; -3 = 3
1 + 2 = 3; -3 = 0
4 + 8 = 12; -3 = 9
2 + 8 = 10; -3 = 7

CAPABILITIES AND FEATURES (Continued)

INERTIAL NAVIGATION SYSTEM (INS)


INS
ROLL, PITCH, DRIFT, COORDINATES AND OTHER INFORMATION TO ADAS
AIRCRAFT TRUE GROUND SPEED INFORMATION
AIRCRAFT DRIFT
INFORMATION FROM INS CONTROLS FILM SPEED, FILM DEVELOPING HEATERS, CRT TRACE INTENSITY AND DRIFT CORRECTION
KNOTS GRD SPEED
DEG DRIFT
XMTR FREQ
PULL TO SET
ANTENNA
BOTH
RANGE
ERROR
DELAY
ANT STAB
LOCK
FILTER HI
LO
PRF RANDOM
FIXED
NAV AUTO
GS
MAN
RESIDUE
XMTR
ON
STBY
BITE CYCLE
CYCLING
POWER
RDY
OFF

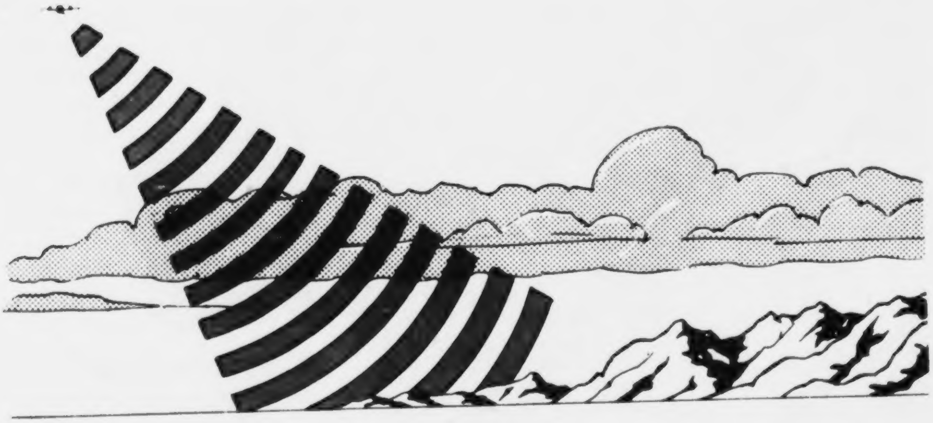
INPUTS FROM THE INERTIAL NAVIGATION SYSTEM (INS)

The inertial navigation system provides aircraft drift and knots ground speed information to the SLAR. This information is used to produce compensations in the recording system to prevent image distortion and displacement.

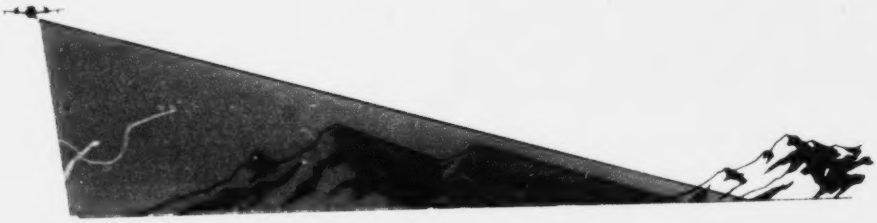
The knots ground speed signal is used primarily in the film drive circuits to keep the film travel speed related directly to aircraft ground speed. Increasing the aircraft's ground speed, or selecting a shorter mapping range, causes the film to travel faster.

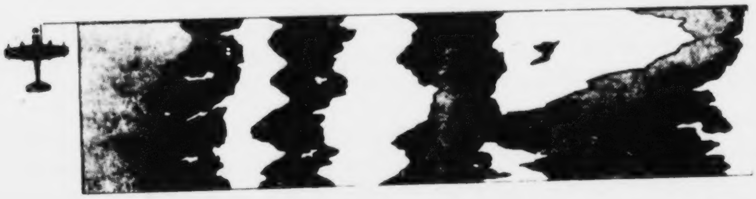
CAPABILITIES AND FEATURES (Continued)

ANALYZING THE RADAR MAP



The SLAR radar map looks like a high altitude aerial photograph, but there are some important differences. In an aerial photograph, the light source is the sun. So time of day, cloud cover, and weather conditions are very important in mission planning. In a radar map, the source of illumination is the radar antenna. Since adar waves go through most cloud cover, time of day and weather conditions are mportant only as they affect flying.

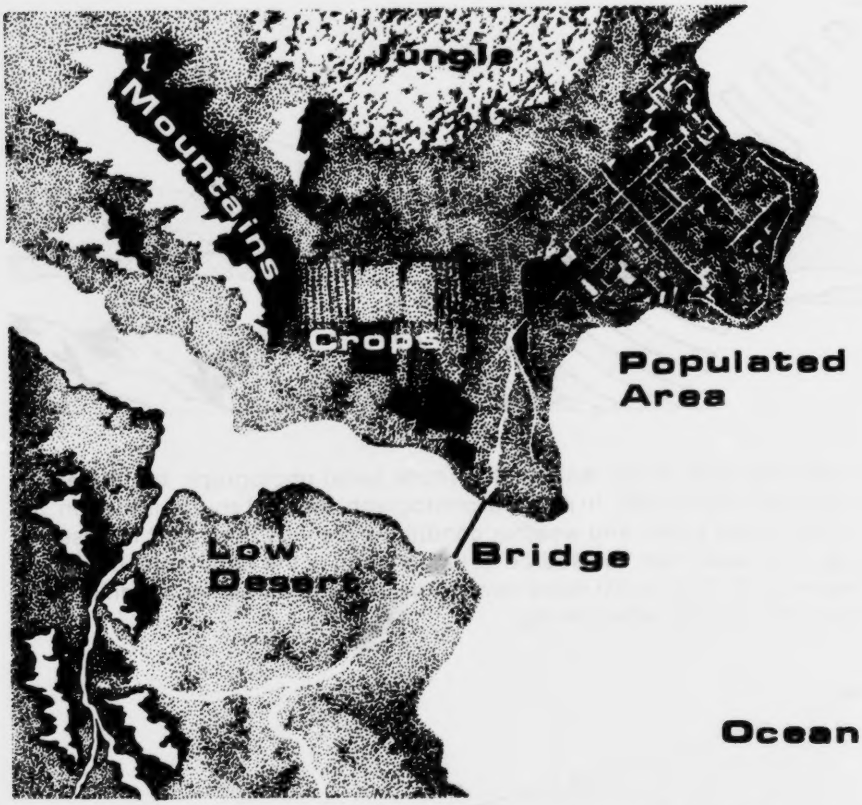




Radar map images are made from radar waves transmitted from the radar antenna and reflected back. Radar waves travel in straight lines, so areas behind mountains or other objects are not in the line-of-sight.

Since they are not in the line-of-sight, they do not reflect the radar waves. These areas appear as shadow shaped clear areas on the film. They show up as white in ne viewer because of the back-lighted illumination panel.

ANALYZING THE RADAR MAP (Continued)



SLAR MAP CONTAINING SEVERAL DIFFERENT TYPES OF TERRAIN

On a photograph, areas in shadows are still lit up a little by scattered light and so just appear darker. Light and dark areas of the radar map are from a different cause.

Images made by the SLAR are a result of how well objects and terrain reflect radar energy. Some objects reflect more radar energy than others. Those objects that are good reflectors of radar energy appear on the film as very dark or black.

Objects that are poor reflectors of radar energy appear very light, but not as white (clear) as those areas in the radar shadow. The different way in which objects reflect radar energy is responsible for the shades of gray from the very light to the very dark on the radar map.

CAPABILITIES AND FEATURES (Continued)

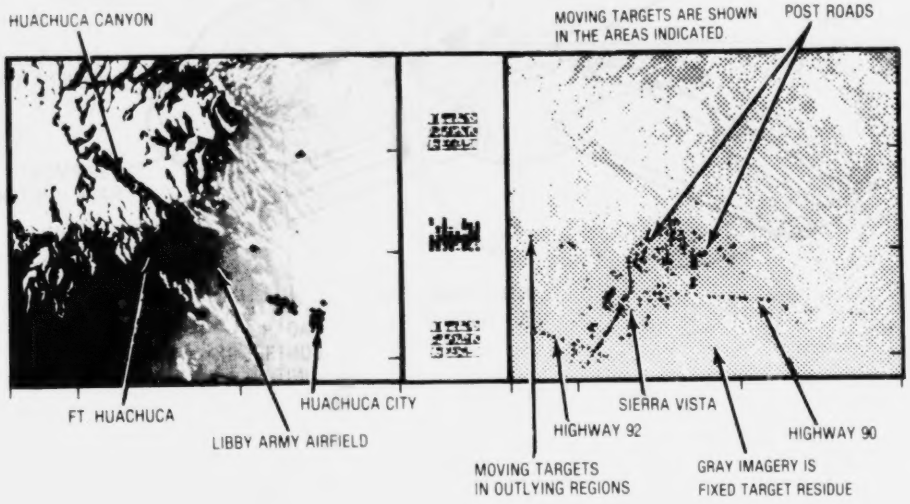
ANALYZING THE RADAR MAP (Continued)

The fixed target (ft) map shows terrain features such as rivers, mountains, buildings and bridges of the mapped area. The moving target (mt) map shows moving objects, such as vehicles or trains. The exact location of moving objects can be determined by comparing the mt map and the corresponding ft map with a military tactical map.

Good interpretation of the maps can also reveal relative speed and direction of movement of moving targets. Changes in terrain characteristics, such as flooding or clearing of fields, leveling of landing strips, and erection of structures, can be detected from studying successive ft radar maps of the same area.

The map shown below is of Fort Huachuca and the surrounding area.

The fixed target map shows Huachuca City, Libby Army Airfield, Fort Huachuca and the town of Sierra Vista. Mountains, roads, streams and other terrain features are also shown.


HUACHUCA CANYON
MOVING TARGETS ARE SHOWN IN THE AREAS INDICATED
POST ROADS
FT HUACHUCA
HUACHUCA CITY
LIBBY ARMY AIRFIELD
SIERRA VISTA
HIGHWAY 92
HIGHWAY 90
MOVING TARGETS IN OUTLYING REGIONS
GRAY IMAGERY IS FIXED TARGET RESIDUE

FIXED TARGET IMAGERY

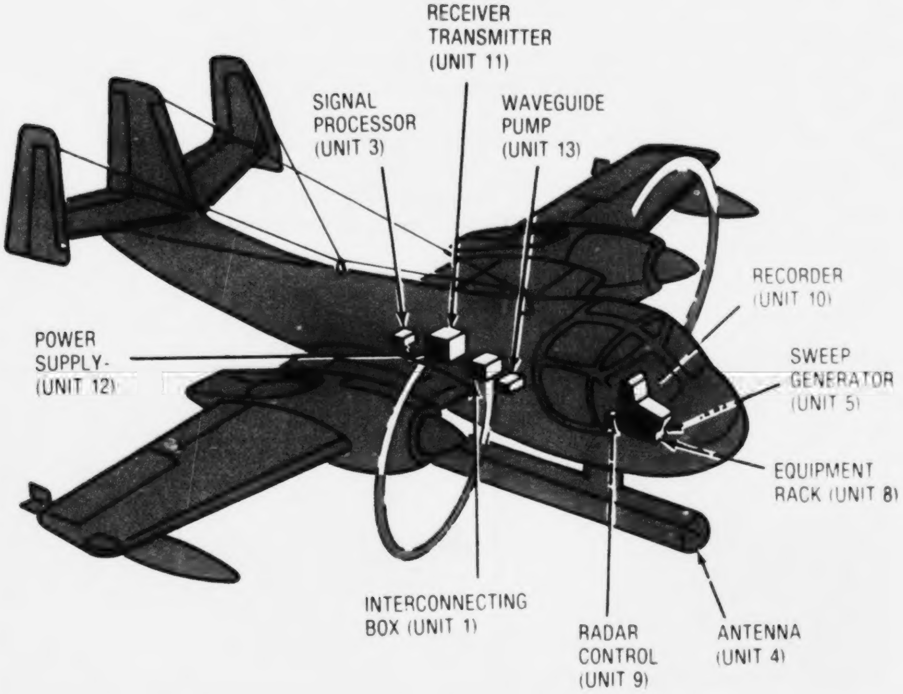
MOVING TARGET IMAGERY

On the moving target map, fixed target features are just barely visible. Moving targets, however, stand out very sharply and are easily identified.

Traffic can be seen on the highways and in the densely populated areas. Several moving objects can also be seen in the outlying regions.

CAPABILITIES AND FEATURES (Continued)

LOCATION OF SLAR COMPONENTS IN THE OV-ID MOHAWK AIRCRAFT


RECEIVER TRANSMITTER (UNIT 11)
SIGNAL PROCESSOR (UNIT 3)
WAVEGUIDE PUMP (UNIT 13)
RECORDER (UNIT 10)
POWER SUPPLY- (UNIT 12)
SWEEP GENERATOR (UNIT 5)
EQUIPMENT RACK (UNIT 8)
INTERCONNECTING BOX (UNIT 1)
RADAR CONTROL (UNIT 9)
ANTENNA (UNIT 4)

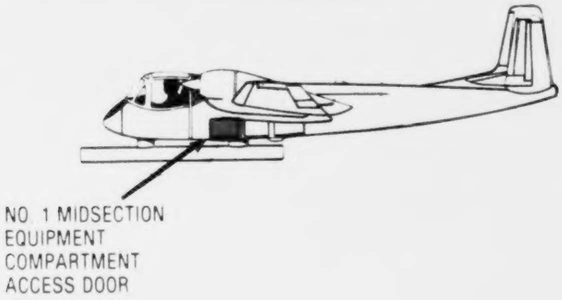
Nine major components make up the SLAR system. Four of these components, the recorder, sweep generator, equipment rack, and radar control are located in the aircraft cockpit.

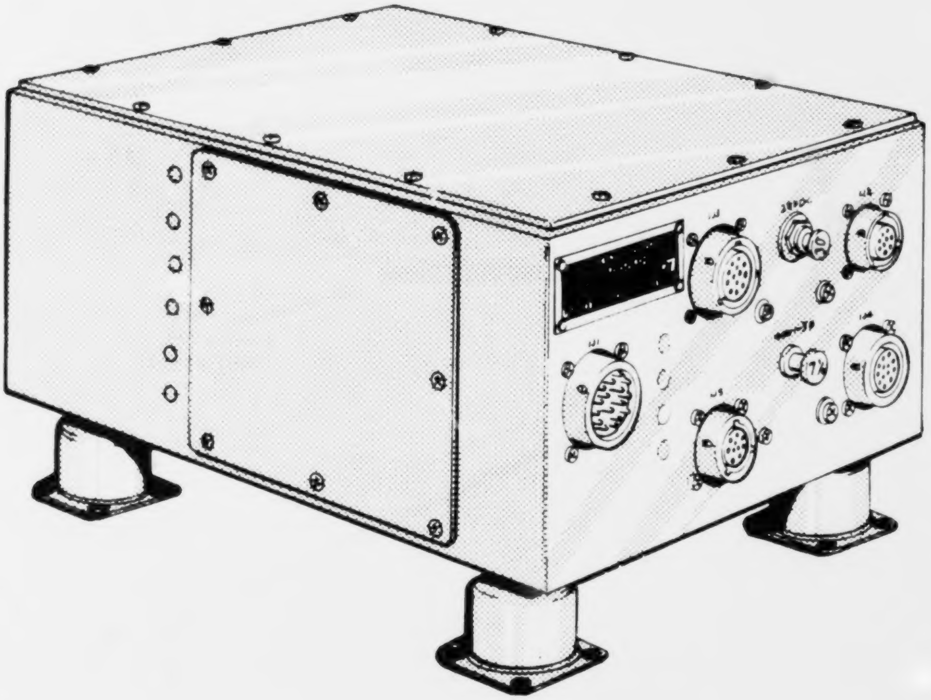
Five of the major components, the waveguide pump, interconnecting box, receiver-transmitter, power supply-mount, and signal processor, are mounted separately in the aircraft equipment compartments.

The antenna assembly is mounted outside the aircraft. Aircraft cabling and waveguide connect the various components.

CAPABILITIES AND FEATURES (Continued)

SLAR COMPONENTS


NO. 1 MIDSECTION
EQUIPMENT
COMPARTMENT
ACCESS DOOR

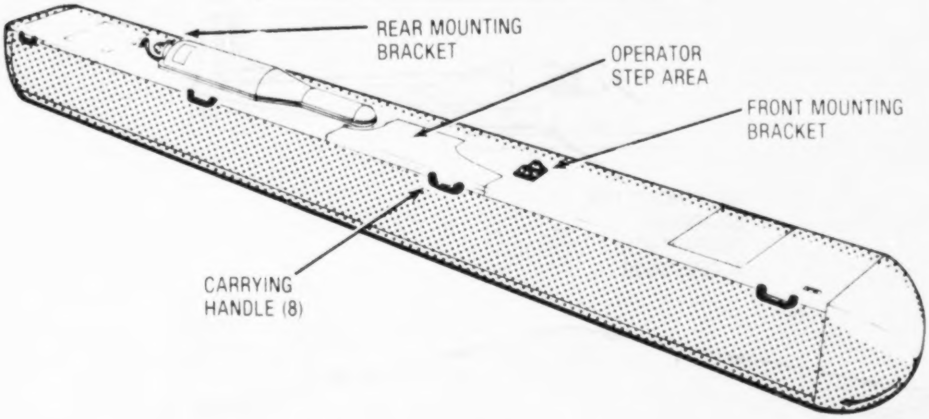


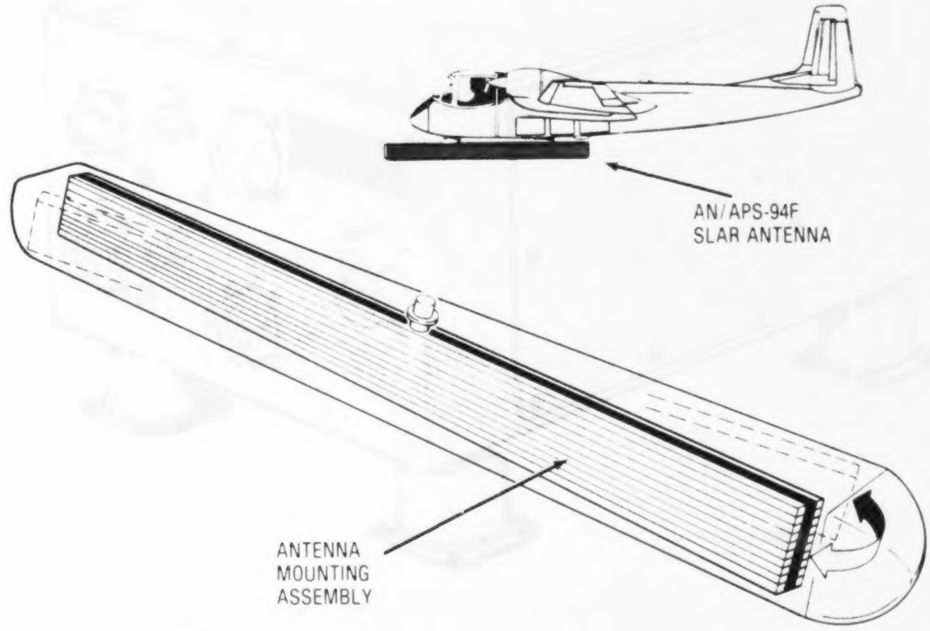
INTERCONNECTING BOX (UNIT 1)

The interconnecting box is installed in the aircraft in No. 1 midsection equipment compartment. Primary power for the SLAR comes to the interconnecting box. From there, power is distributed to the other SLAR components.

CAPABILITIES AND FEATURES (Continued)

SLAR COMPONENTS (Continued)


REAR MOUNTING BRACKET
OPERATOR STEP AREA
FRONT MOUNTING BRACKET
CARRYING HANDLE (8)


AN/APS-94F SLAR ANTENNA
ANTENNA MOUNTING ASSEMBLY

ANTENNA (UNIT 4)

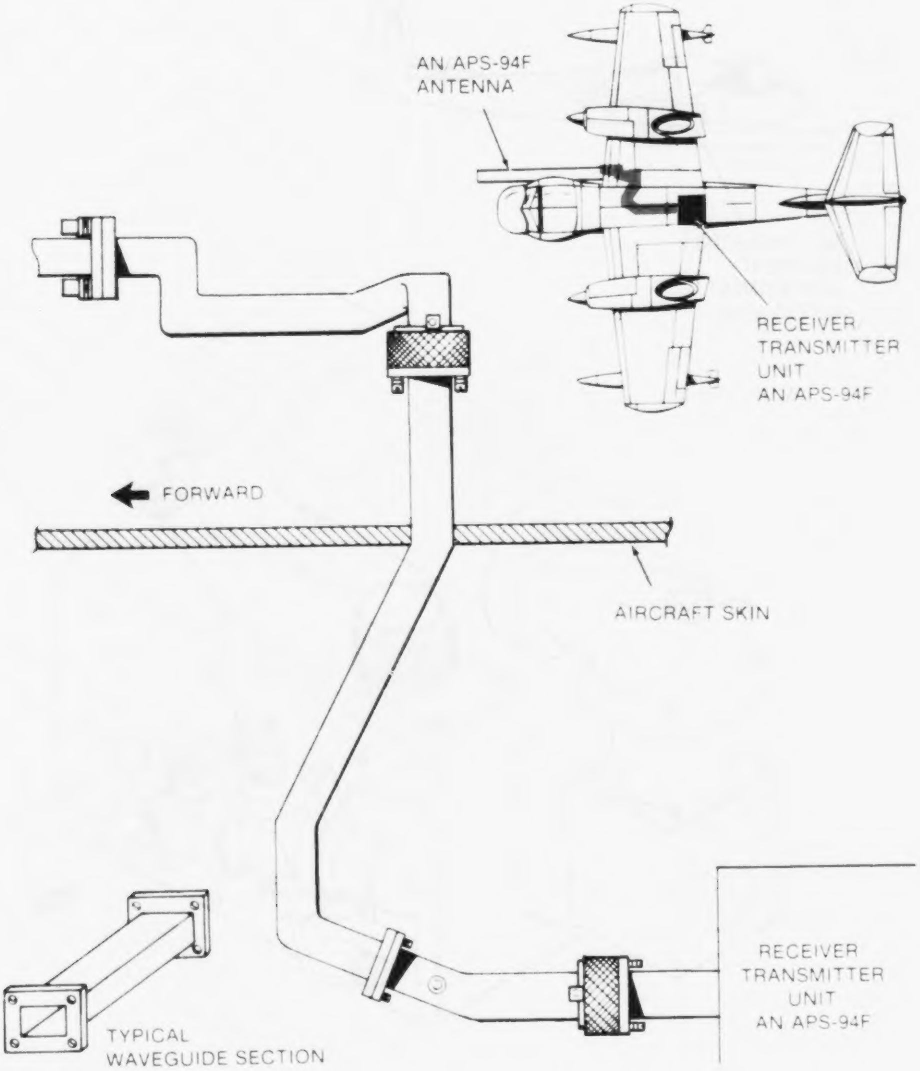
The antenna assembly consists of antenna, switches and limiters, receiver preamplifiers, a gyro stabilization system, and a radome.

The radome encloses all other antenna assembly components. It is hard-mounted to the bottom right fuselage of the aircraft.

The antenna sends and receives the radar pulses. The gyro stablilization system keeps the antenna mounting assembly pointed along the line-of-flight when the aircraft is pivoting slightly from side-to-side (yawing).

CAPABILITIES AND FEATURES (Continued)

SLAR COMPONENTS (Continued)

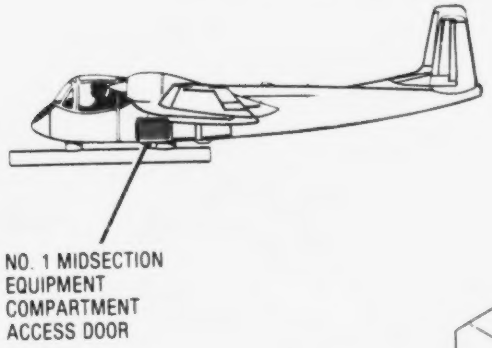

AN/APS-94F
ANTENNA
RECEIVER
TRANSMITTER
UNIT
AN/APS-94F
FORWARD
AIRCRAFT SKIN
RECEIVER
TRANSMITTER
UNIT
AN/APS-94F
TYPICAL
WAVEGUIDE SECTION

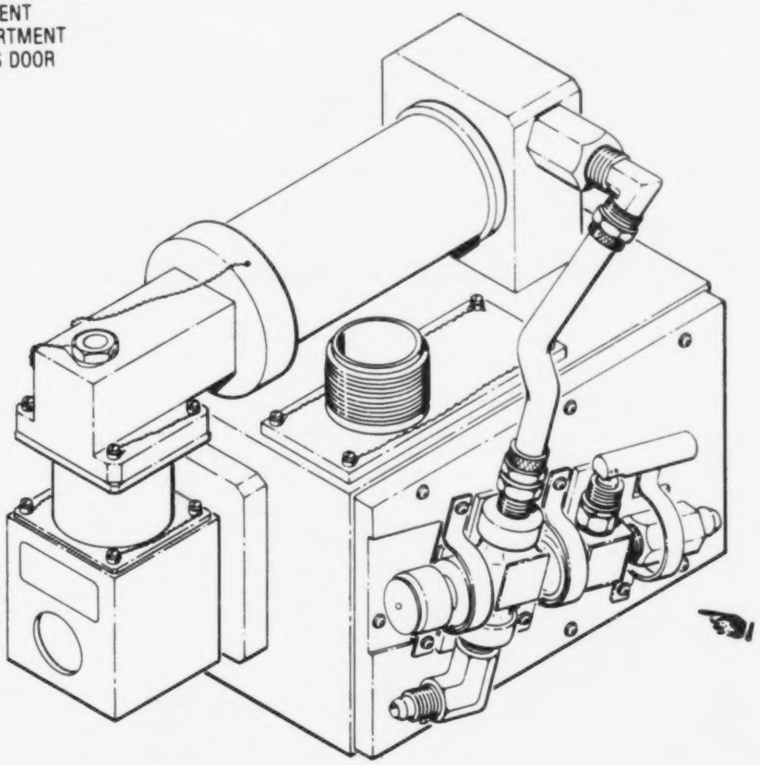
AIRCRAFT WAVEGUIDE

The waveguide (not a part of the SLAR) is a hollow rectangular pipe that channels rf energy between the receiver-transmitter and the antenna. The receiver-transmitter generates the rf (radar) pulse and broadcasts it into the waveguide. The pulse, in the form of an electromagnetic wavefront, travels through the waveguide to the antenna. The antenna sends the pulse out in a narrow beam. When the pulse reflects off of objects on the ground, some of the reflected energy is picked up again by the antenna. The antenna changes this energy to an electronic signal and sends it to the receiver-transmitter.

CAPABILITIES AND FEATURES (Continued)

SLAR COMPONENTS (Continued)



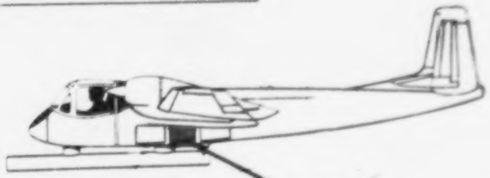


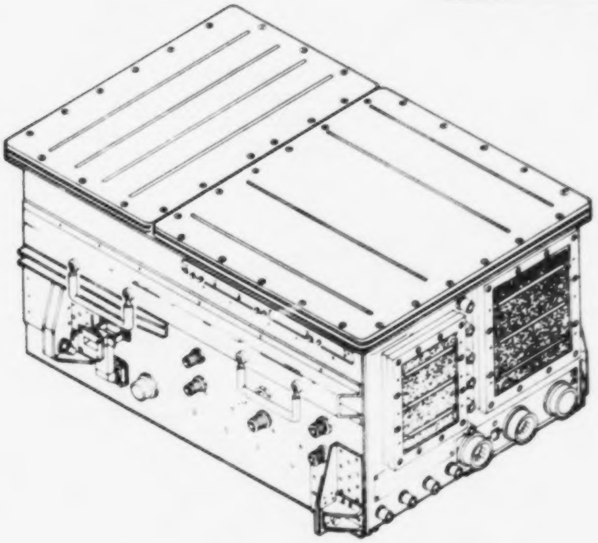
WAVEGUIDE PUMP (UNIT 13)

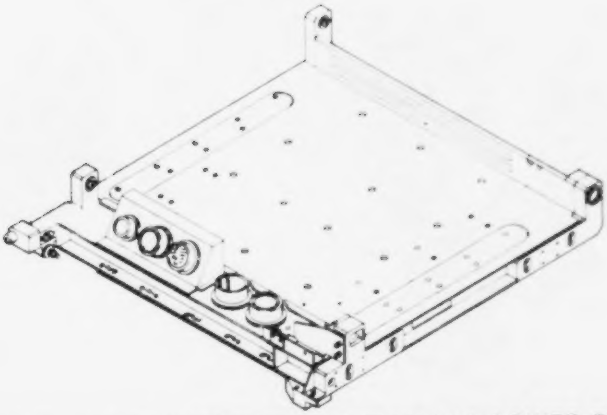
The waveguide pump is installed in the aircraft in the No. 1 midsection equipment compartment. It is a dry air, electric-motor driven, pressurization pump. Its purpose is to prevent arcing within the waveguide. It does this by maintaining a constant air pressure of approximately 27 pounds per square inch (PSIA). A desiccant/dehydrator assembly filters the air and keeps it dry.

CAPABILITIES AND FEATURES (Continued)

SLAR COMPONENTS (Continued)


FORWARD
BAGGAGE
COMPARTMENT


RECEIVER/
TRANSMITTER


POWER-SUPPLY
MOUNT

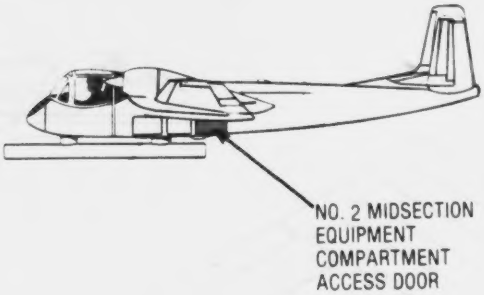
RECEIVER-TRANSMITTER (UNIT 11) AND POWER-SUPPLY MOUNT (UNIT 12)

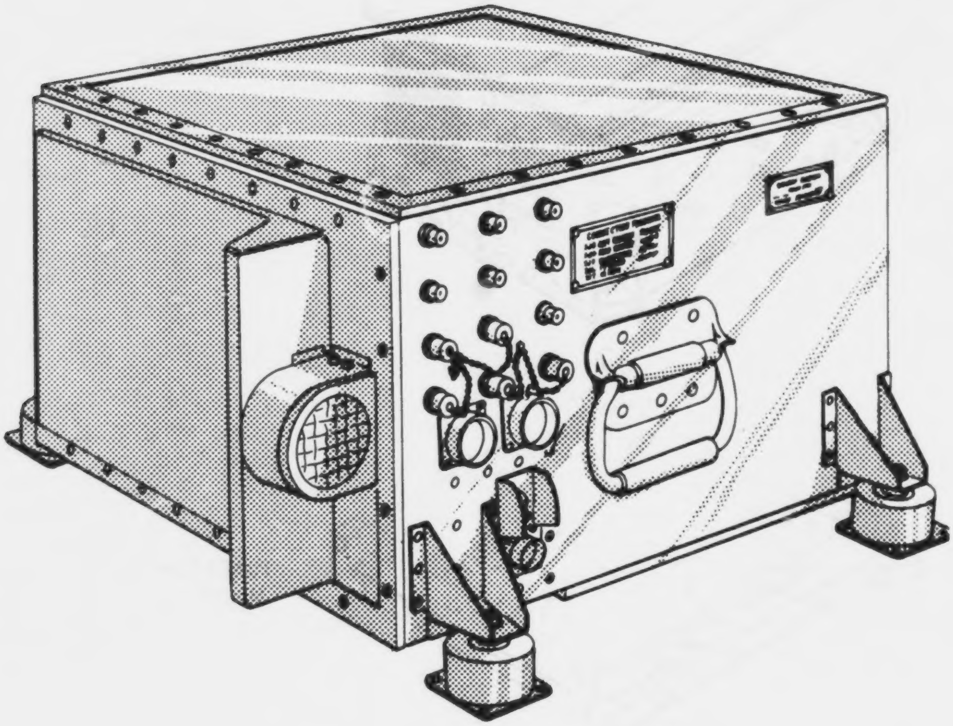
The receiver-transmitter generates the radar pulses, and sends them through waveguides to the antenna. It also receives the return pulses from the antenna and converts them to electronic signals. These signals are sent to the signal processor. The power-supply mount provides all operating voltages for the receiver-transmitter.

The receiver-transmitter is installed on the power-supply mount in the forward baggage compartment.

CAPABILITIES AND FEATURES (Continued)

SLAR COMPONENTS (Continued)

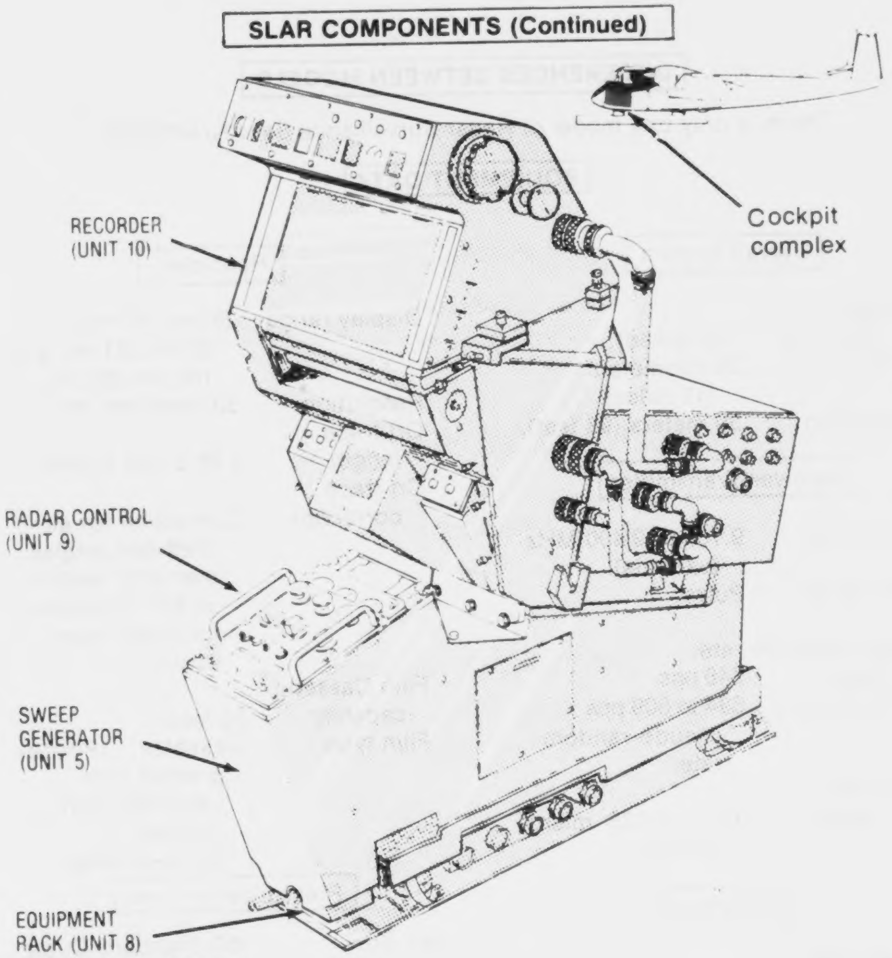

NO. 2 MIDSECTION
EQUIPMENT
COMPARTMENT
ACCESS DOOR



SIGNAL PROCESSOR (UNIT 3)

The signal processor is installed in the aircraft in No. 2 midsection equipment compartment. It receives the electronic signal from the receiver-transmitter and uses it to create the MT and FT Video. The signal processor also controls timing and synchronization for all SLAR operations.

SLAR COMPONENTS (Continued)



COCKPIT COMPLEX

The cockpit complex is the group of components with which you will become most familiar. These components are: the recorder (unit 10), radar control (unit 9), sweep generator (unit 5), and equipment rack (unit 8).

The radar control is used to set all of the conditions for radar mapping, such as: transmitter frequency, range, and antenna selection. It also contains the built-in test equipment (BITE) indicators and BITE start pushbutton.

The recorder receives the radar video signal from the signal processor and uses it to produce the radar map film strip. The recorder interfaces directly with the receiver-transmitter, signal processor and ADAS system.

The recorder and radar control are mounted on the sweep generator. The sweep generator is, in turn, mounted on the equipment rack. The sweep generator provides sweep and other signals and operating voltages to the recorder. The equipment rack serves as a mount and electrical interface between cockpit complex components and other SLAR components.

CAPABILITIES AND FEATURES (Continued)

DIFFERENCES BETWEEN MODELS

There is only one model of Radar Surveillance Set AN/APS-94F

EQUIPMENT DATA

Overall System

Range:	
Maximum	(classified).
Minimum	25 kilometers (15 miles).
Resolution	30 meters (98 feet).

Receiver-Transmitter

Frequency	9,100 to 9,400 MHz (variable).
Modulation	Pulse.
Pulse repetition rate:	
Fixed	746 pps.
Random	694 to 809 pps , pseudo-random rate.
Pulse width	0.2 ± 0.025 microsecond.

Antenna

Beamwidth (horizontal)	0.45 + 0.05, -0.10 degrees between half power points.
Pattern (vertical)	Cosecant squared (±1.5 dB) over a depression angle from 4° to 45°
Operating altitude	20,000 feet ASL (6,097 meters) max.
Yaw stabilization	3 degrees left and right.

Recorder

Display range	25 km (15 mi), 50 km (31 mi) and 100 km (62 mi).
Resolution	30 lines/mm min.
Crt trace length	3.95 ± 0.05 inches.
Crt trace correction	Correction for aircraft drift angles over ±15° within ±0.65°. Correction for radar beam squint.
Film Cassette capacity	50 feet.
Film type	Cassette, Photographic Film LM-229A (part number SM-A-878294).

Pressurization Unit

Air flow	150 Standard Cubic Inches per Minute minimum.
Pressurization	Will pressurize a 300 cu. in volume to a nominal 27 P.S.I.A. within 5 minutes, with a starting P.S.I.A. of 6.7 or greater.
Pressure switch	Actuates compressor at 24.0 P.S.I.A. minimum and deactuates compressor at 30.0 P.S.I.A. maximum.
Nominal Pressure	27 P.S.I.A.

CAPABILITIES AND FEATURES (Continued)

PROTECTION CIRCUITS

YOU NEED TO KNOW ABOUT THE PROTECTION CIRCUITS. THEY CAN CAUSE YOUR SLAR TO SHUT OFF WHEN OPERATING, OR PREVENT IT FROM COMING ON IF YOU ARE STARTING UP.

INTERLOCK PROTECTION

If power cables to any major component are not connected, the SLAR will not start up. If any power cable comes loose during operation the SLAR will shut off.

UNDER AND OVER VOLTAGE PROTECTION

Your SLAR will operate with power inputs of between 102 and 124 volts ac, and between 20 and 32 volts dc. If the input voltages go above or below these values, the SLAR will automatically shut off.

OVERHEAT PROTECTION

The SLAR will shut off automatically if an overheat condition exists in the processor, receiver-transmitter, or sweep generator.

UNDER PRESSURE PROTECTION

The waveguide is pressurized to prevent high-voltage arcing. If waveguide pressure gets too low, the SLAR stops transmitting. and XMTR ON indicator goes black. In STBY position, the RDY indicator blinks to signal low waveguide pressure.

OVERCURRENT PROTECTION

Circuit Breakers protect the aircraft electrical system and SLAR components, from overcurrent conditions within the SLAR system. The location of each SLAR circuit breaker is shown in the PMCS table.

WHEN A PROTECTION CIRCUIT ACTIVATES.

Look in operation under Unusual Conditions (Chap 2, Sec IV). It describes indications of protection circuit operation and instructs you in actions to be taken.

SECTION III

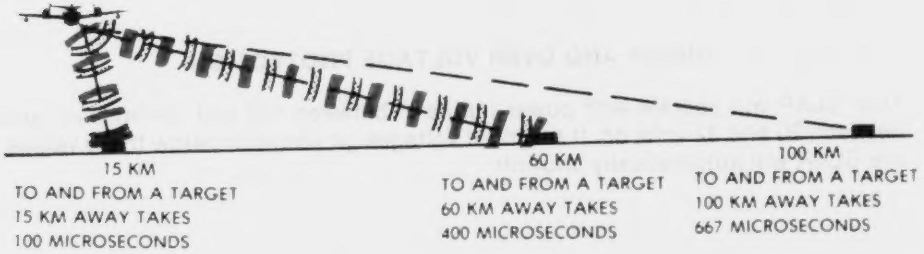
TECHNICAL PRINCIPLES OF OPERATION

BASIC RADAR PRINCIPLES

The side-looking airborne radar (SLAR) operates on the following basic principles:

① Radar energy travels in a straight line at the speed of light (about 300,000 km per second).

Since this speed is constant, distance can be determined by measuring the time it takes a radar pulse to travel to an object and return to the radar system.

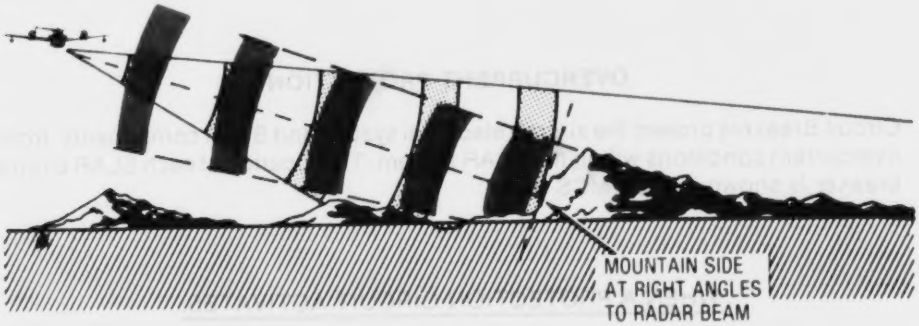

15 KM
TO AND FROM A TARGET
15 KM AWAY TAKES
100 MICROSECONDS
60 KM
TO AND FROM A TARGET
60 KM AWAY TAKES
400 MICROSECONDS
100 KM
TO AND FROM A TARGET
100 KM AWAY TAKES
667 MICROSECONDS

Comparison of times to targets in microseconds (millionths of a second).

② All objects reflect part of the energy of the radar pulse that strikes them.

The radar pulse is directed from the antenna in a beam toward the target. Part of the pulse energy is reflected from the target and its surroundings.

The larger a surface is, the more energy it receives. Thus, a large structure reflects more energy than a small one. The strongest reflections usually occur when the radar beam arrives at right angles to reflecting surfaces.

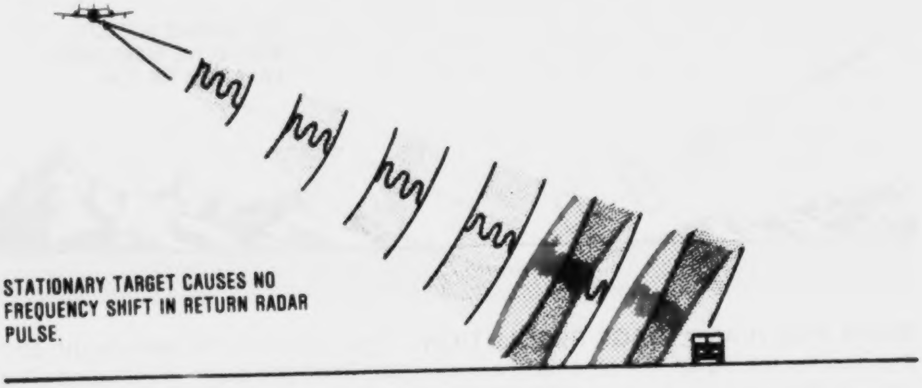

MOUNTAIN SIDE
AT RIGHT ANGLES
TO RADAR BEAM

Radar pulses striking target at right angles give strongest reflections and show up as strongest targets on radar map.

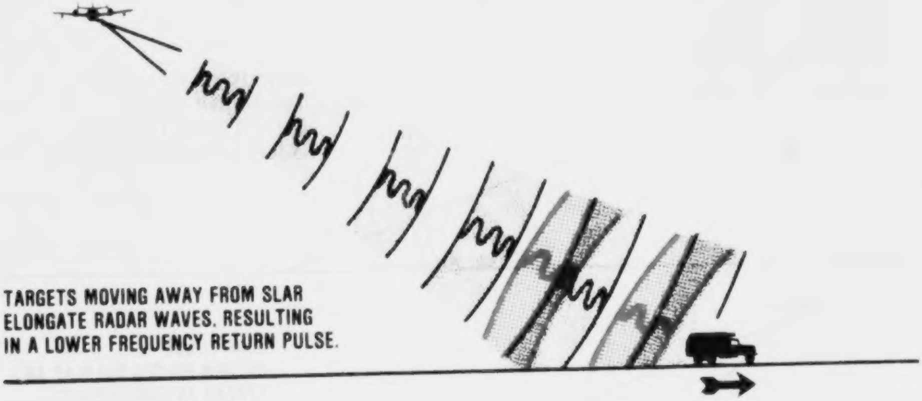
BASIC RADAR PRINCIPLES (Continued)

③ Moving objects cause radar energy to shift frequency slightly (Doppler shift).

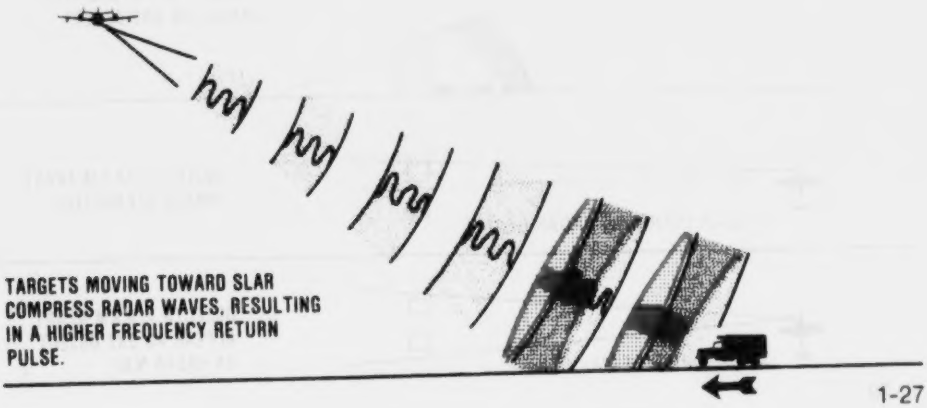
Return radar pulses from objects moving toward the SLAR will have a higher frequency than stationary objects. Return pulses from objects moving away from the SLAR will have a lower frequency than stationary objects. It is the SLAR's ability to detect these subtle shifts in frequency that makes detection of moving targets possible.



STATIONARY TARGET CAUSES NO FREQUENCY SHIFT IN RETURN RADAR PULSE.



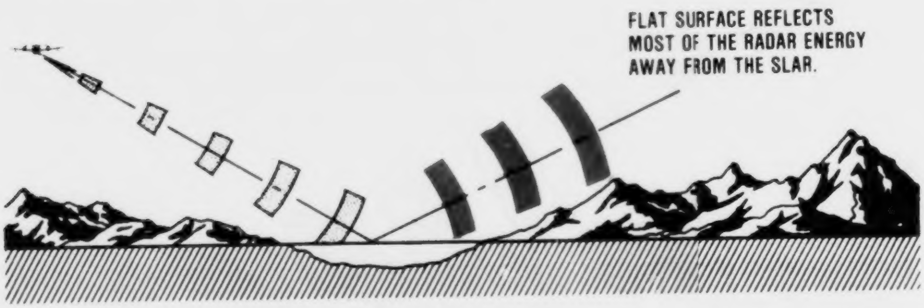
TARGETS MOVING AWAY FROM SLAR ELONGATE RADAR WAVES, RESULTING IN A LOWER FREQUENCY RETURN PULSE.



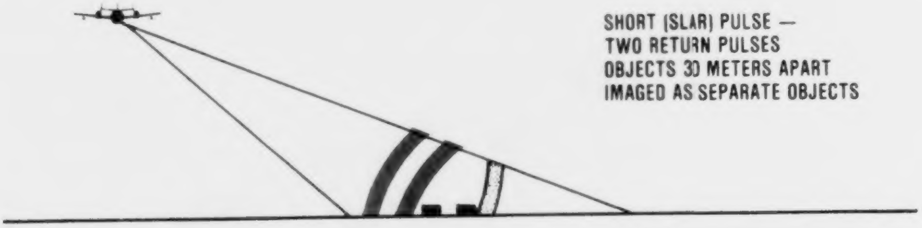
TARGETS MOVING TOWARD SLAR COMPRESS RADAR WAVES, RESULTING IN A HIGHER FREQUENCY RETURN PULSE.

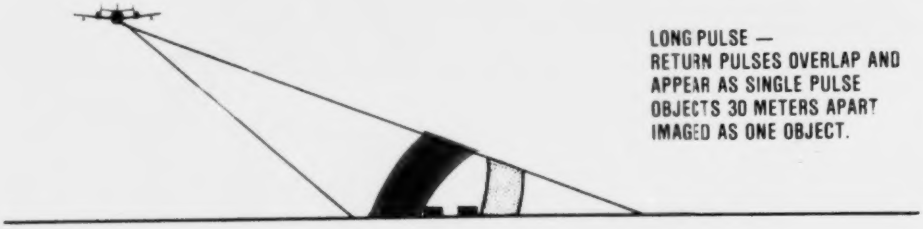
BASIC RADAR PRINCIPLES (Continued)

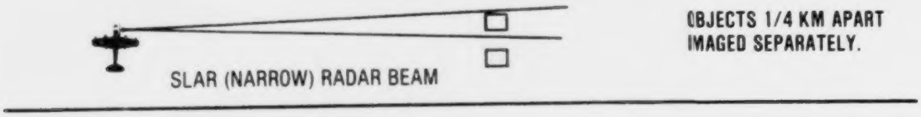
REFLECTANCE. Some materials reflect energy better than others. Of the commonly used structural materials, wood is the poorest reflector and steel is the best. Masonry without metal reinforcing is a fair reflector. Lakes, rivers, runways, or similar features, illuminated by the SLAR at low angles of incidence, bounce the radar signal as a flat mirror reflects a beam of light. Very little of the radiated energy which strikes them is returned to the SLAR.

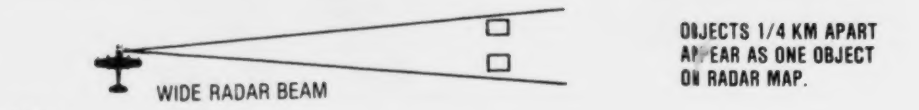

FLAT SURFACE REFLECTS
MOST OF THE RADAR ENERGY
AWAY FROM THE SLAR.

BEAM WIDTH AND IMAGE RESOLUTION. The narrower the beam width and the shorter the pulse, the smaller the area from which the beam is reflected. The smaller the area the better the image resolution.


SHORT (SLAR) PULSE —
TWO RETURN PULSES
OBJECTS 30 METERS APART
IMAGED AS SEPARATE OBJECTS

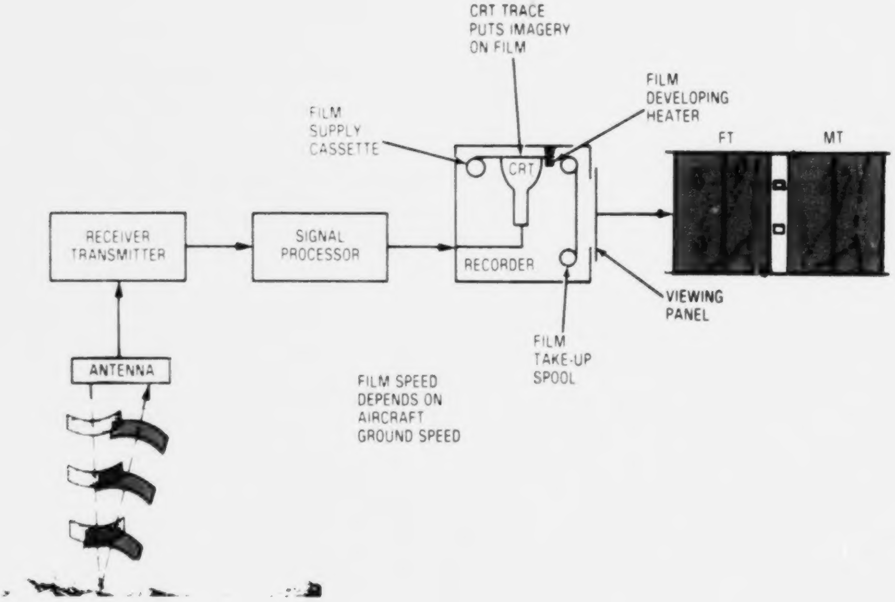

LONG PULSE —
RETURN PULSES OVERLAP AND
APPEAR AS SINGLE PULSE
OBJECTS 30 METERS APART
IMAGED AS ONE OBJECT.


SLAR (NARROW) RADAR BEAM
OBJECTS 1/4 KM APART
IMAGED SEPARATELY.


WIDE RADAR BEAM
OBJECTS 1/4 KM APART
APPEAR AS ONE OBJECT
ON RADAR MAP.

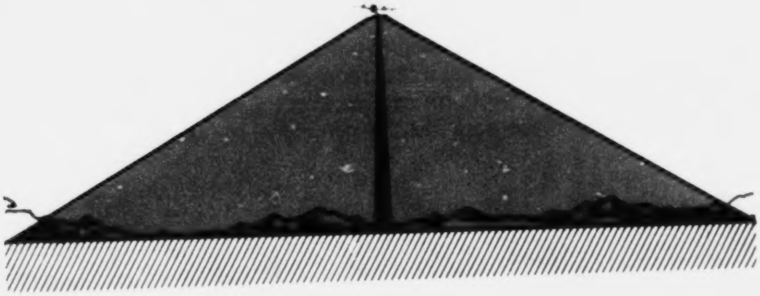
SLAR OPERATION

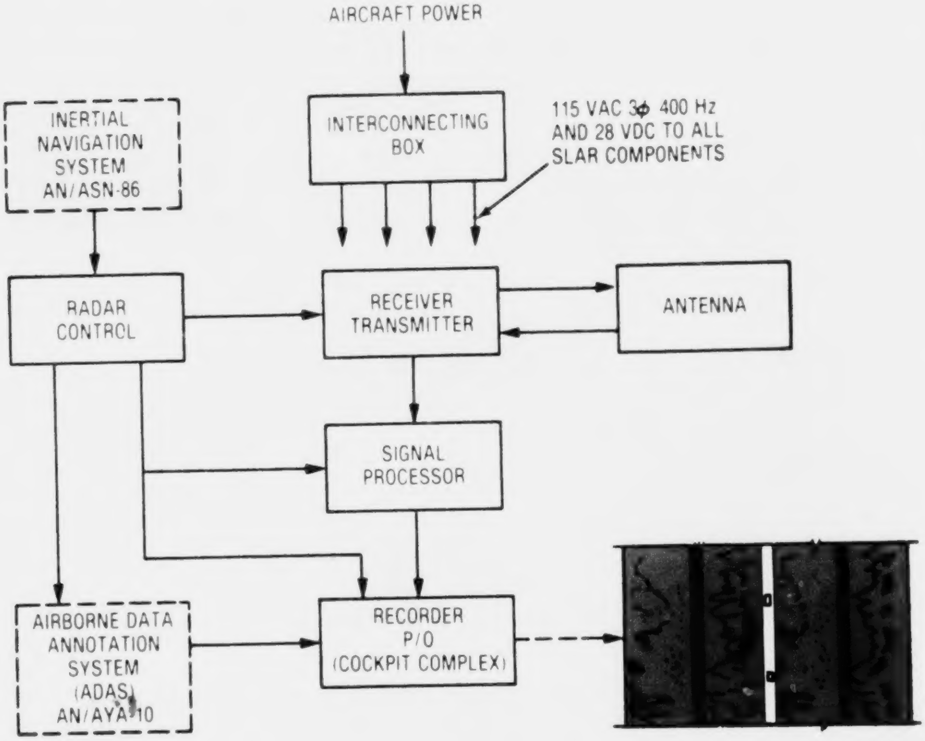
Radar pulses transmitted by the antenna strike objects on the ground, are reflected, and picked up again by the antenna during its receiving cycle. The return radar pulses are converted to an electronic signal, amplified, processed, and applied to cathode ray tubes (crts) in the recorder. The crt trace is brighter at those points corresponding to objects on the ground causing the strongest radar returns. It is darker in those areas of little or no radar returns.


CRT TRACE PUTS IMAGERY ON FILM
FILM DEVELOPING HEATER
FILM SUPPLY CASSETTE
FT
MT
CRT
RECEIVER TRANSMITTER
SIGNAL PROCESSOR
RECORDER
VIEWING PANEL
FILM TAKE-UP SPOOL
ANTENNA
FILM SPEED DEPENDS ON AIRCRAFT GROUND SPEED

Film traveling across the face of the crts is exposed by the crt traces, and permanently records the radar imagery. The exposed film is then developed as it passes over a heater assembly. In a few minutes the finished film comes into view at the film viewing panel.

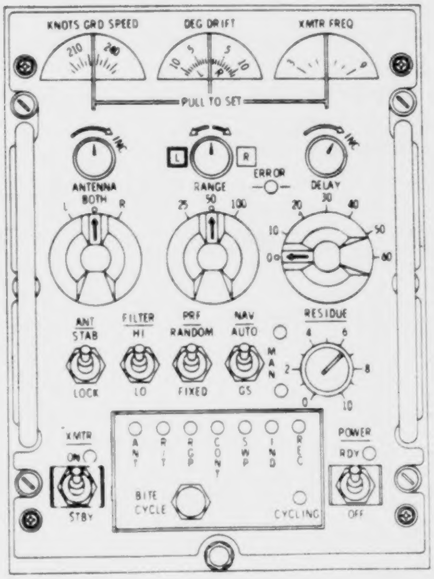
SLAR COMPONENTS INTERFACE




AIRCRAFT POWER
INTERCONNECTING BOX
115 VAC 3ϕ 400 Hz AND 28 VDC TO ALL SLAR COMPONENTS
INERTIAL NAVIGATION SYSTEM AN/ASN-86
RADAR CONTROL
RECEIVER TRANSMITTER
ANTENNA
SIGNAL PROCESSOR
AIRBORNE DATA ANNOTATION SYSTEM (ADAS) AN/AYA-10
RECORDER P/O (COCKPIT COMPLEX)

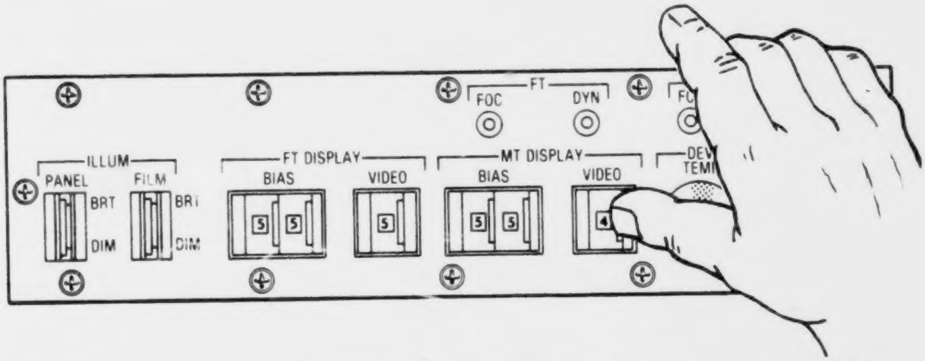
THE OPERATOR

Although many radar system functions are automatic, you, the operator, control SLAR operation. Through the operator's controls, you select the operating frequency, antenna usage (left, right, or both), range (the width of the area presented in the radar map — 25, 50, or 100 kilometers), and radar set delay (the distance from the aircraft to where radar mapping starts).


KNOTS GRD SPEED
210
240
DEG DRIFT
10
5
0
5
10
L
R
XMTR FREQ
PULL TO SET
INC
ANTENNA
BOTH
L
R
RANGE
L
R
ERROR
DELAY
25
50
100
0
10
20
30
40
50
60
ANT STAB
LOCK
FILTER
HI
LO
PRF
RANDOM
FIXED
NAV
AUTO
MAN
GS
RESIDUE
0
2
4
6
8
10
XMTR
ON
STBY
ANT
R/T
RGP
CONT
SWP
IND
REC
BITE CYCLE
CYCLING
POWER
RDY
OFF

You also choose whether the antenna is automatically stabilized or locked into place, which radar signal filtering (high or low) to use, whether the pulse-repetition-frequency (PRF) is at a random or a fixed rate.

You may choose to set the KNOTS GRD-SPD and DEG DRIFT controls manually, or you may decide to have that information fed directly into the SLAR from the aircraft inertial navigation system.


FT
FOC
DYN
FC
ILLUM
PANEL
FILM
BRT
DIM
FT DISPLAY
BIAS
VIDEO
MT DISPLAY
BIAS
VIDEO
DEV
TEM
5
5
5
5
5
4

In addition to selecting the operating parameters discussed above, you also determine the conditions for recording radar imagery on the photographic film strip. Before beginning your actual mapping run, you will set the film background level and radar video level for both FT and MT maps. For the mt map you will also select the proper residue level; getting just the right amount of ft imagery on the mt map to allow you to locate the moving targets easily.

You should get to know all of the controls on both the recorder and radar control units. By understanding exactly what each control does and what effect it has, you will be able to produce the highest quality radar map for any of the various mission requirements.

CHAPTER 2

OPERATING INSTRUCTIONS

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      - Left—BIAS, BRT, FOCUS 2-13
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SECTION 1

DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

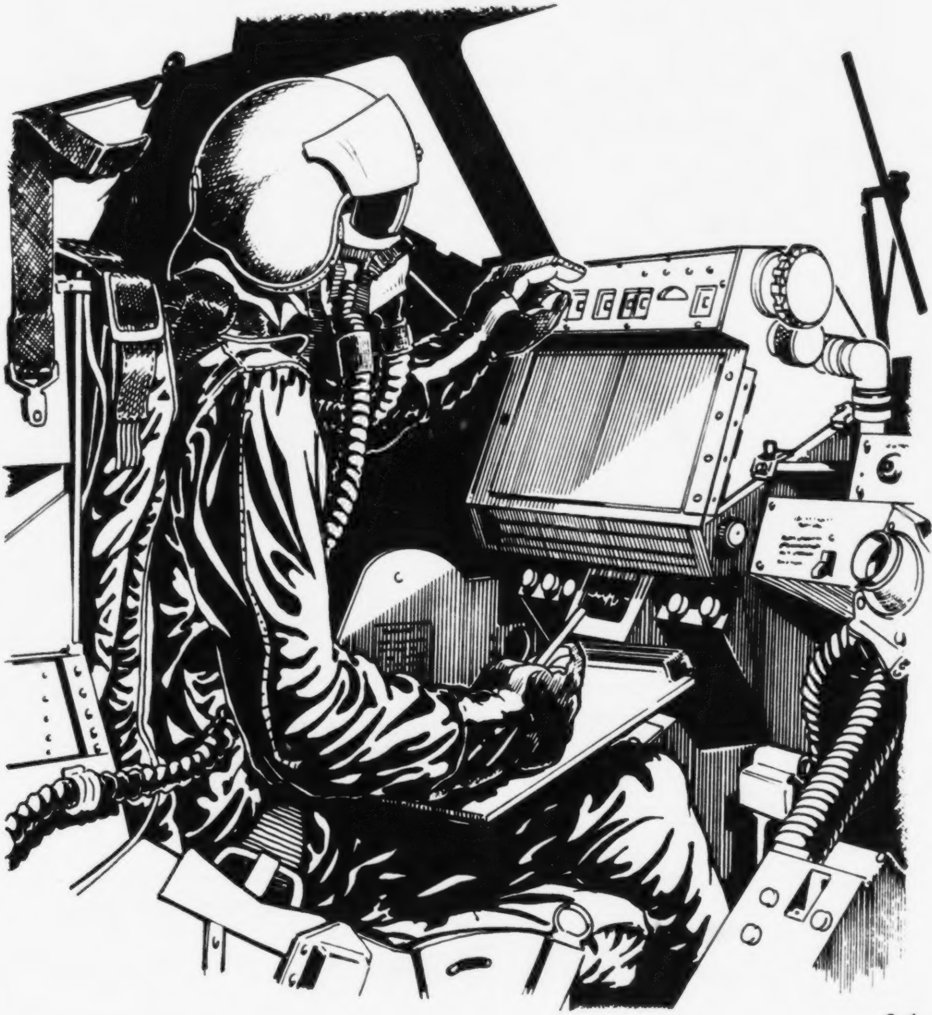
All controls and indicators you need to operate the SLAR are located on the radar control unit or on the recorder. This section explains the exact function of each control and indicator.

Do not operate the SLAR until:

① You know exactly what each control and indicator does.

② You have studied the operating procedures.

③ You are familiar with all warnings, cautions and notes.



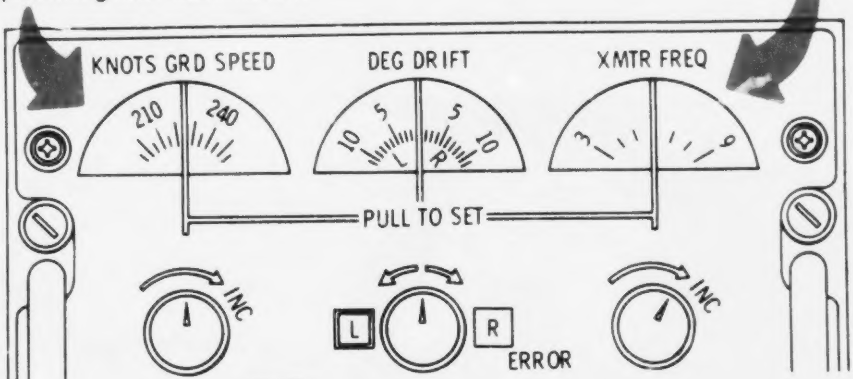
CONTROLS AND INDICATORS

RADAR CONTROL

KNOTS GRD SPEED — Dial shows groundspeed of aircraft in knots. When NAV switch is at AUTO or GS, KNOTS GRD SPEED dial indicates current aircraft groundspeed from inertial navigation system. When NAV switch is at MAN, groundspeed must be set in manually using KNOTS GRD SPEED control knob because INS is not providing this information.

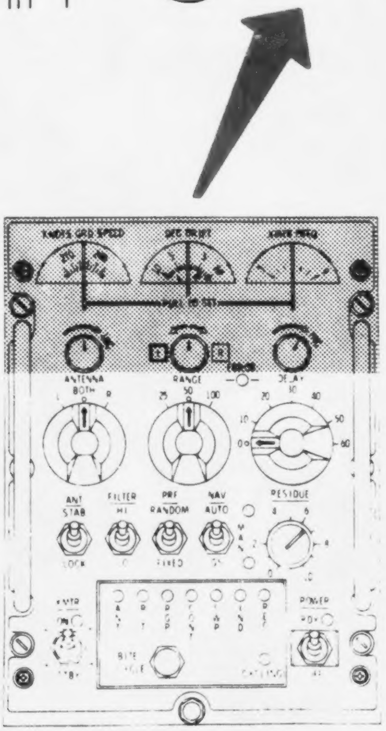
XMTR FREQ — Selects and indicates radar transmitting frequency.

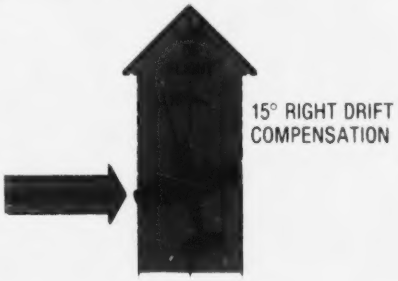
Dial is marked in arbitrary units from 0 through 12. Numbers are for reference and do not represent actual frequencies.


KNOTS GRD SPEED
210
240
DEG DRIFT
10
5
5
10
L
R
XMTR FREQ
3
9
PULL TO SET
INC
L
R
ERROR
INC

DEG DRIFT — Dial shows aircraft drift angle in degrees.

When NAV switch is at AUTO, drift angle information comes from inertial navigation system. When NAV switch is at MAN or GS, operator sets drift angle with DEG DRIFT knob.


KNOTS GRD SPEED
DEG DRIFT
XMTR FREQ
PULL TO SET
ANTENNA
BOTH
L
R
RANGE
25
50
100
DELAY
ANT
STAB
LOCK
FILTER
HI
PRF
RANDOM
FIXED
NAV
AUTO
GS
RESIDUE
XMTR
POWER
BITE


15° RIGHT DRIFT
COMPENSATION

NOTE

The DEG DRIFT control affects only the crt trace (causes it to rotate). It does not affect antenna position.

CONTROLS AND INDICATORS (Continued)

RADAR CONTROL (Continued)

ANTENNA switch — Selects area to be mapped.

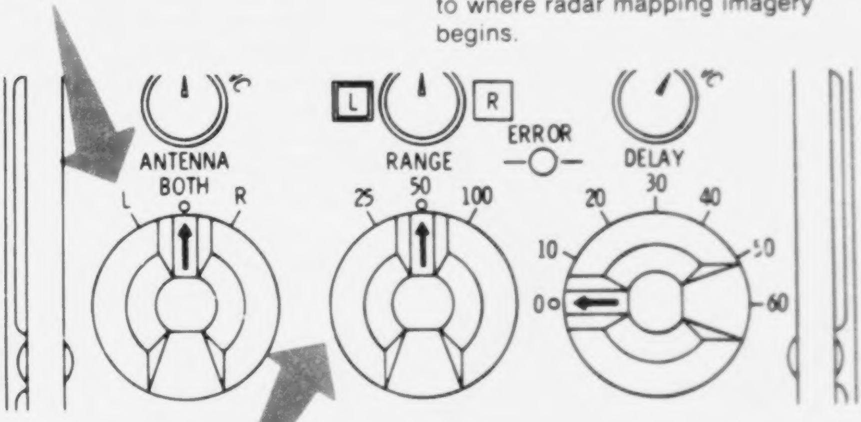
L: to map left of flight path.

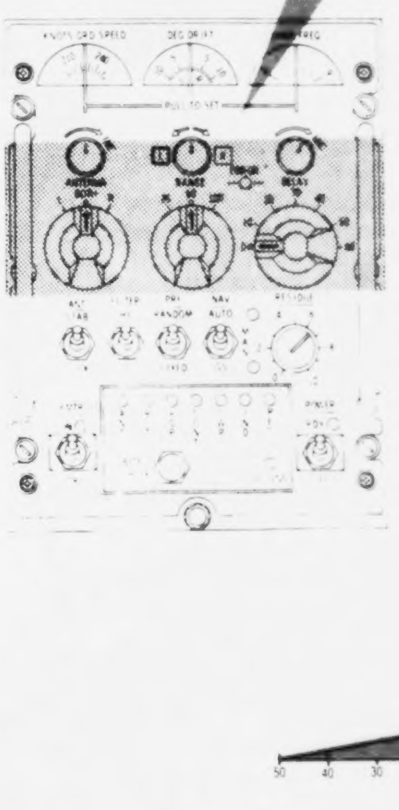
R: to map right of flight path.

BOTH: to map both left and right of flight path.

RANGE switch — Selects width (in kilometers) of area presented on radar map.

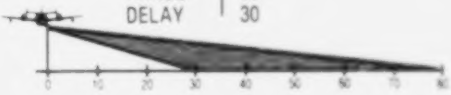
DELAY switch — Determines distance (in kilometers) from aircraft to where radar mapping imagery begins.


ANTENNA
BOTH
L
R
L
R
RANGE
25
50
100
ERROR
DELAY
0
10
20
30
40
50
60



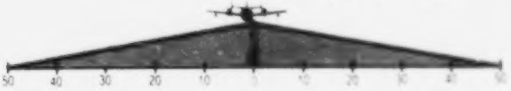
ERROR indicator — normally black. Blinks white when combination of selected RANGE and DELAY exceeds maximum range of SLAR.

SWITCH	SWITCH SETTING
ANTENNA	R
RANGE	50
DELAY	30


0
10
20
30
40
50
60
70
80

(Aircraft moving away from observer.)

SWITCH	SWITCH SETTING
ANTENNA	BOTH
RANGE	50
DELAY	0


50
40
30
20
10
0
10
20
30
40
50

CONTROLS AND INDICATORS (Continued)

RADAR CONTROL (Continued)

ANT switch —

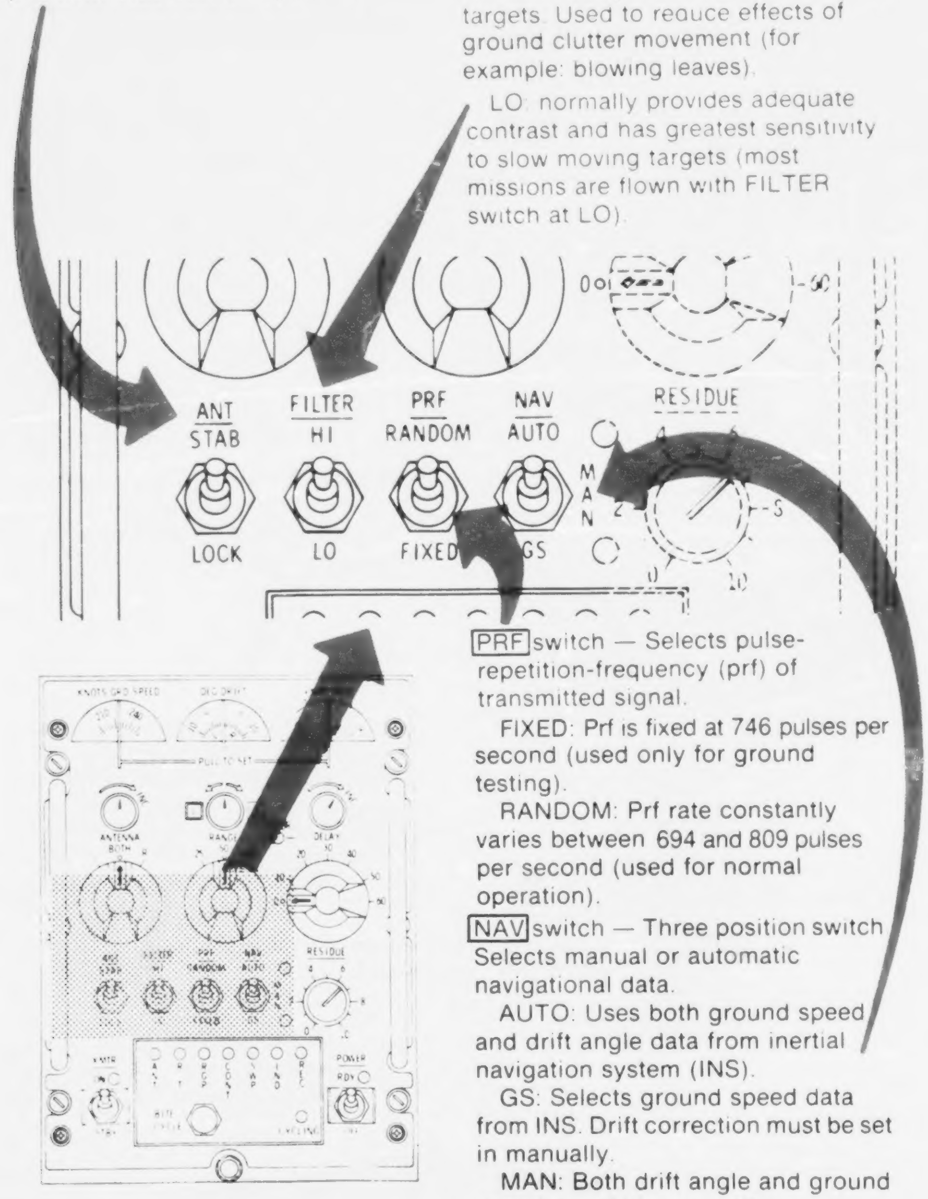
STAB: antenna gyro stabilization system turned on.

LOCK: antenna locked into position. Stabilization system off.

FILTER switch — Controls low-frequency filter for best MT map imagery.

HI: improves signal contrast, but reduces ability to detect slow moving targets. Used to reduce effects of ground clutter movement (for example: blowing leaves).

LO: normally provides adequate contrast and has greatest sensitivity to slow moving targets (most missions are flown with FILTER switch at LO).


ANT
STAB
LOCK
FILTER
HI
LO
PRF
RANDOM
FIXED
NAV
AUTO
GS
MAN
RESIDUE
KNOTS GRD SPEED
DEG DRIFT
PULL TO SET
ANTENNA
RANGE
DELAY
XMTR
POWER
RDY
BITE
CYCLING

PRF switch — Selects pulse-repetition-frequency (prf) of transmitted signal.

FIXED: Prf is fixed at 746 pulses per second (used only for ground testing).

RANDOM: Prf rate constantly varies between 694 and 809 pulses per second (used for normal operation).

NAV switch — Three position switch Selects manual or automatic navigational data.

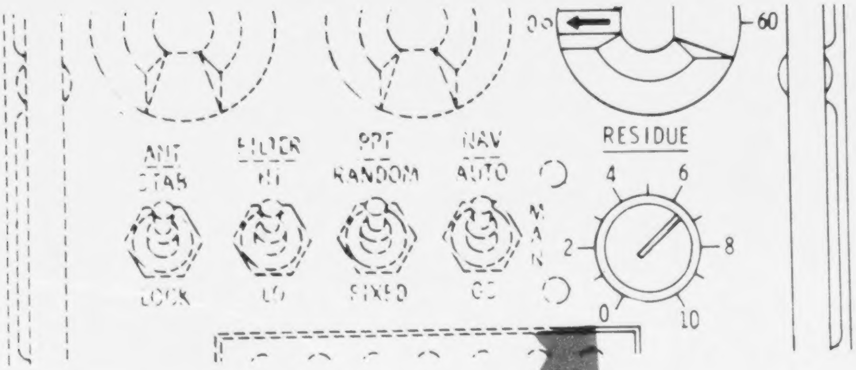
AUTO: Uses both ground speed and drift angle data from inertial navigation system (INS).

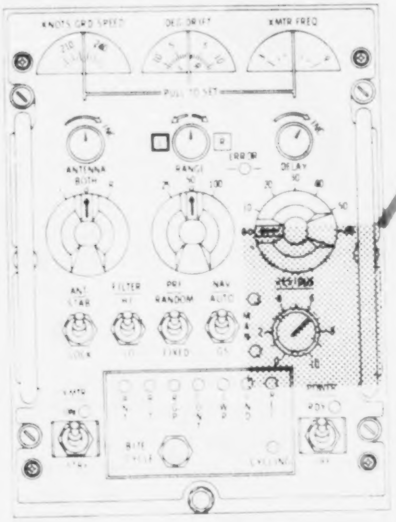
GS: Selects ground speed data from INS. Drift correction must be set in manually.

MAN: Both drift angle and ground speed are set in manually.

CONTROLS AND INDICATORS (Continued)

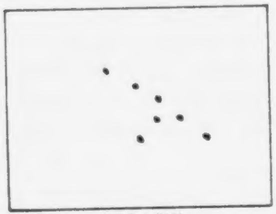
RADAR CONTROL (Continued)


60
RESIDUE
ANT
STAB
LOCK
FILTER
HI
LO
PRF
RANDOM
FIXED
NAV
AUTO
GS
M
A
N
0
2
4
6
8
10

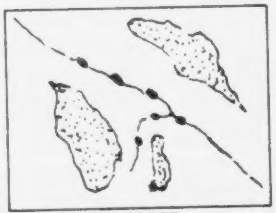

KNOTS GRD SPEED
DEG DRIFT
XMTR FREQ
PULL TO SET
ANTENNA
RANGE
ERROR
DELAY
ANT
STAB
FILTER
HI
PRF
RANDOM
NAV
AUTO
RESIDUE
XMTR
CYCLING
POWER

RESIDUE control — Controls amount of ft video appearing as background imagery on mt map.

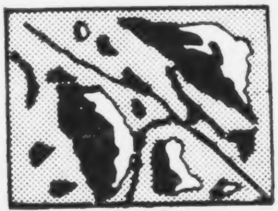
Clockwise rotation increases background imagery. RESIDUE control is properly set when moving targets are plainly visible and just enough background is present to enable you to pinpoint target location.



TOO LOW



CORRECT



TOO HIGH

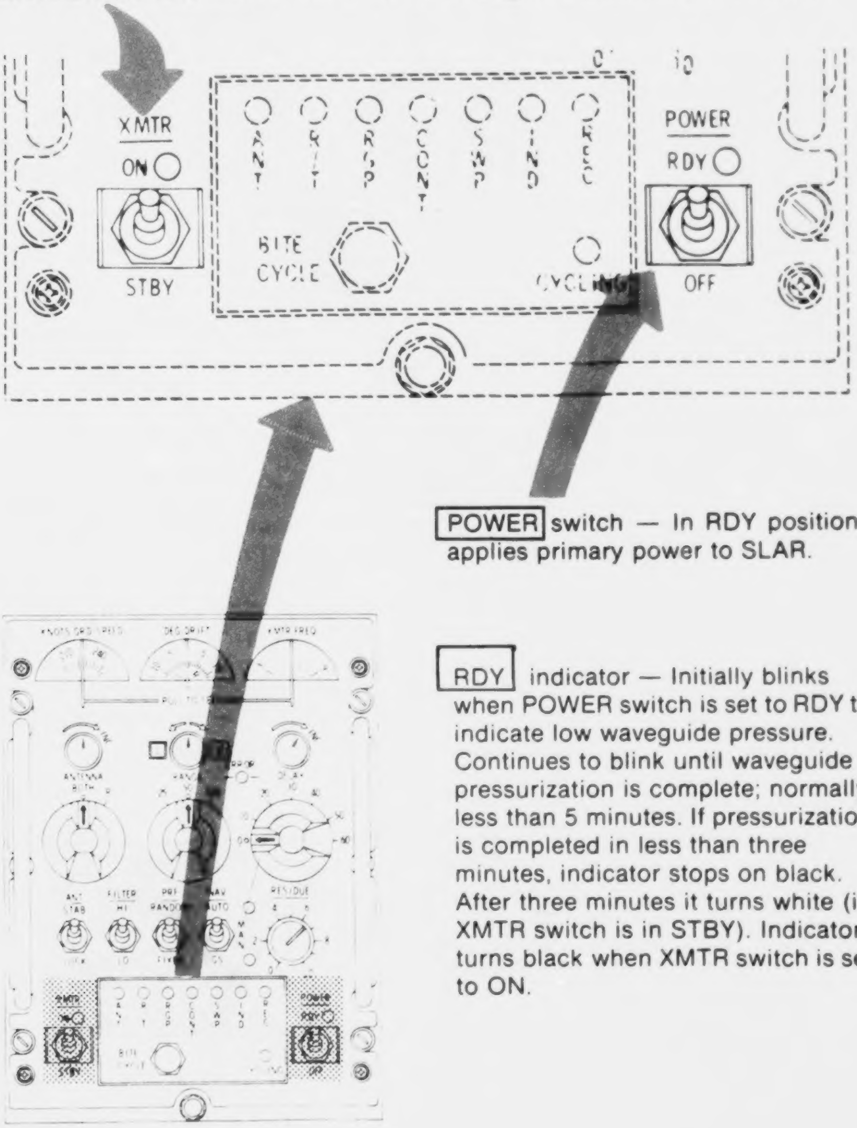
CONTROLS AND INDICATORS (Continued)

RADAR CONTROL (Continued)

XMTR switch — Controls transmitter power.

STBY: Applies standby power to receiver-transmitter (if power switch set to RDY).

ON: If POWER switch has been set to RDY more than 3 minutes, and pressurization is complete, XMTR-ON applies full power to receiver-transmitter. XMTR-ON indicator turns white and SLAR begins transmitting rf energy.


XMTR
ON
STBY
ANT
R/T
RCP
CONT
SWP
IND
REC
BITE CYCLE
CYCLING
POWER
RDY
OFF
KNOTS GRD SPEED
DEG DRIFT
XMTR FREQ
ANTENNA
FILTER
RESIDUE

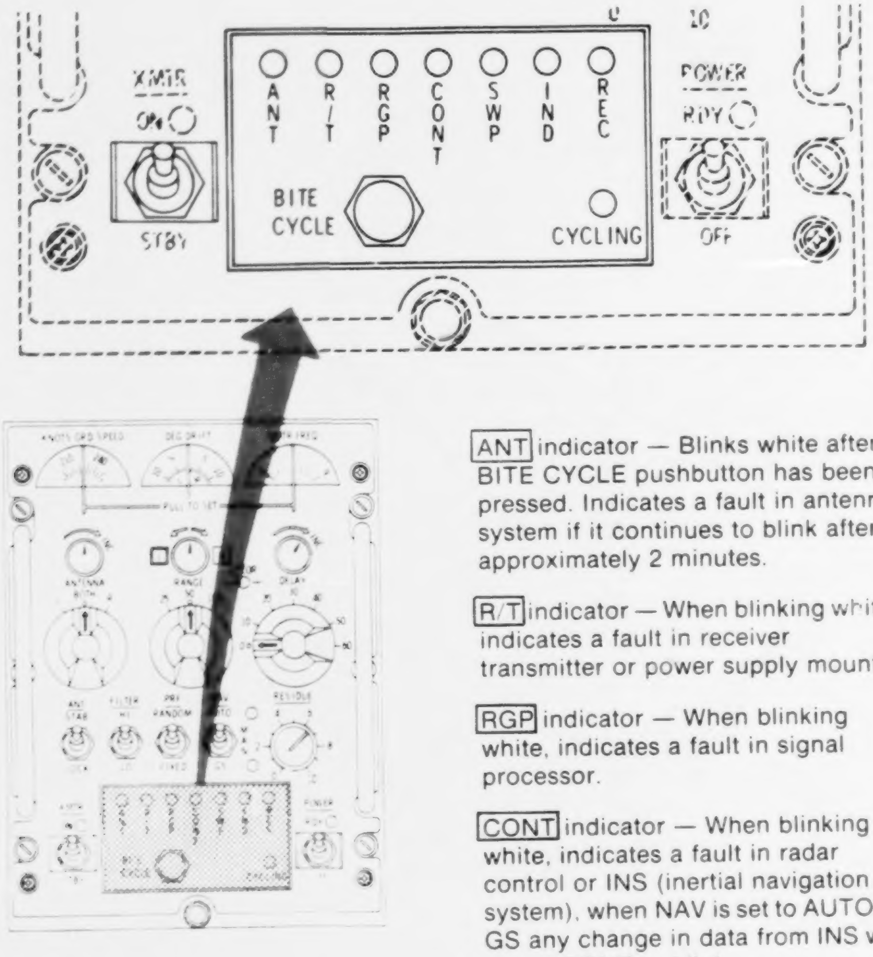
POWER switch — In RDY position, applies primary power to SLAR.

RDY indicator — Initially blinks when POWER switch is set to RDY to indicate low waveguide pressure. Continues to blink until waveguide pressurization is complete; normally less than 5 minutes. If pressurization is completed in less than three minutes, indicator stops on black. After three minutes it turns white (if XMTR switch is in STBY). Indicator turns black when XMTR switch is set to ON.

CONTROLS AND INDICATORS (Continued)

RADAR CONTROL (Continued)

BITE section — Contains BITE CYCLE pushbutton and indicators for built-in test equipment (BITE) system.



ANT indicator — Blinks white after BITE CYCLE pushbutton has been pressed. Indicates a fault in antenna system if it continues to blink after approximately 2 minutes.

R/T indicator — When blinking white, indicates a fault in receiver transmitter or power supply mount.

RGP indicator — When blinking white, indicates a fault in signal processor.

CONT indicator — When blinking white, indicates a fault in radar control or INS (inertial navigation system), when NAV is set to AUTO or GS any change in data from INS will cause CONT to blink.

SWP indicator — When blinking white, indicates fault in sweep generator.

IND indicator — When blinking white, indicates fault in recorder.

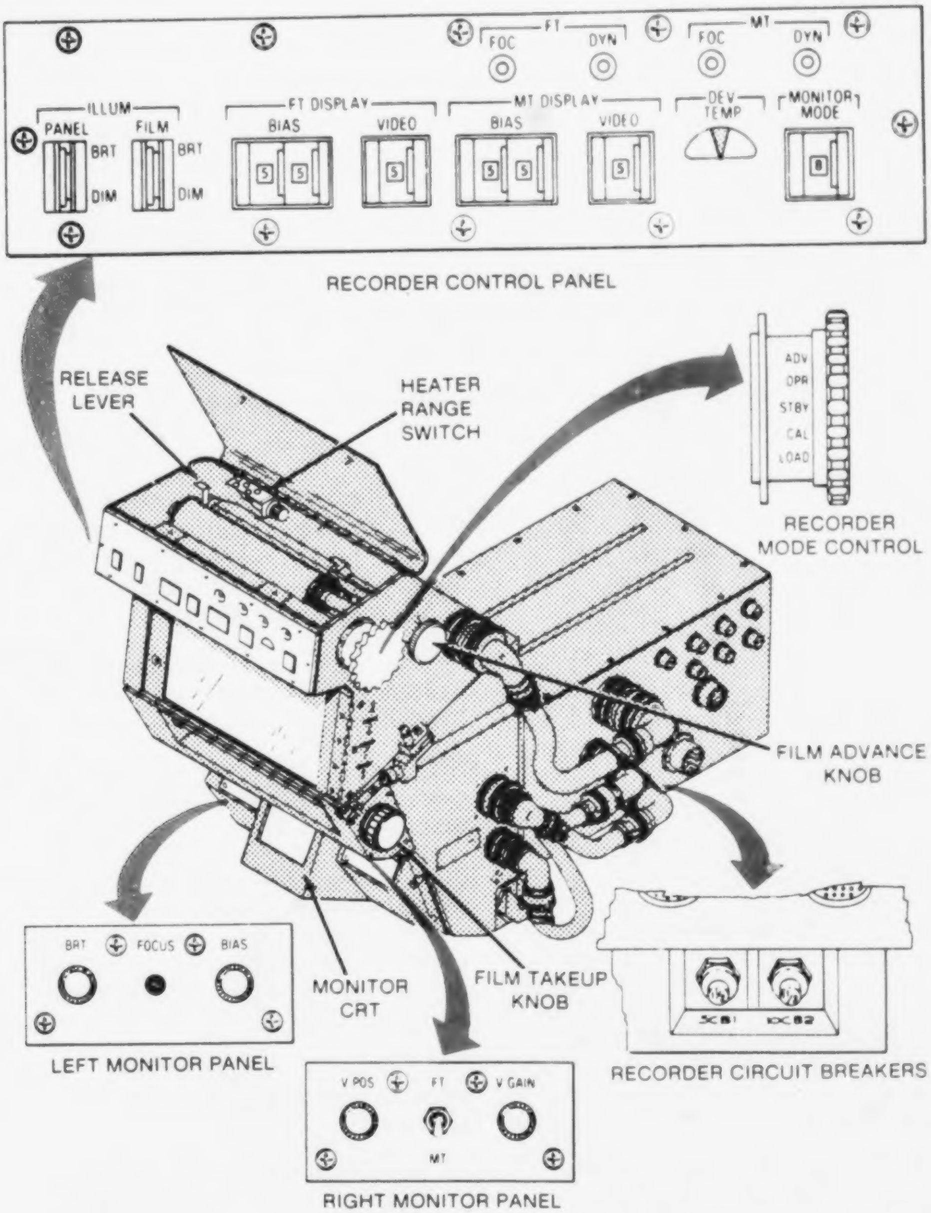
REC indicator — Not used.

BITE CYCLE pushbutton — When pressed, initiates self-test of antenna, signal processor, and receiver-transmitter/power supply-mount.

CYCLING indicator — When white (for approximately 2 minutes after BITE CYCLE pushbutton is pressed), indicates BITE CYCLE self-test in progress.

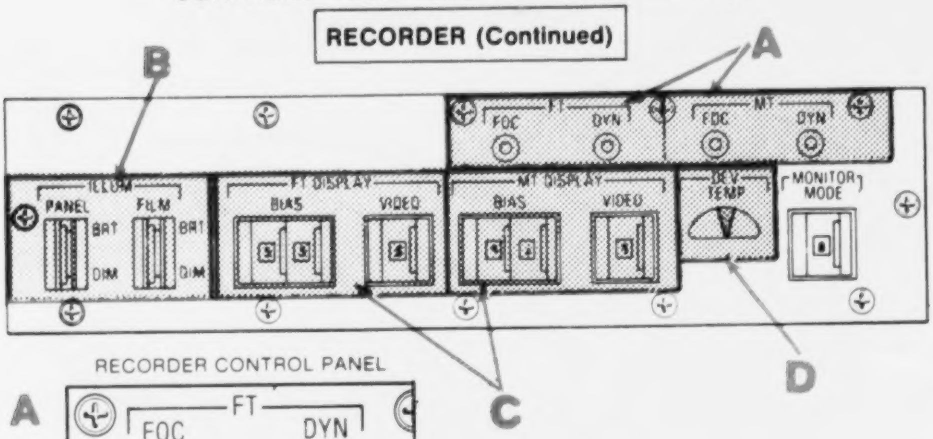
CONTROLS AND INDICATORS (Continued)

RECORDER


FT
FOC
DYN
MT
FOC
DYN
ILLUM
PANEL
FILM
BRT
DIM
BRT
DIM
FT DISPLAY
BIAS
VIDEO
MT DISPLAY
BIAS
VIDEO
DEV TEMP
MONITOR MODE
RECORDER CONTROL PANEL
RELEASE LEVER
HEATER RANGE SWITCH
ADV
OPR
STBY
CAL
LOAD
RECORDER MODE CONTROL
FILM ADVANCE KNOB
BRT
FOCUS
BIAS
LEFT MONITOR PANEL
MONITOR CRT
FILM TAKEUP KNOB
CB1
CB2
RECORDER CIRCUIT BREAKERS
V POS
FT
V GAIN
MT
RIGHT MONITOR PANEL

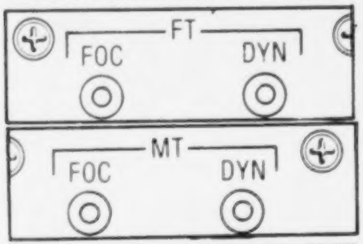
CONTROLS AND INDICATORS (Continued)

RECORDER (Continued)

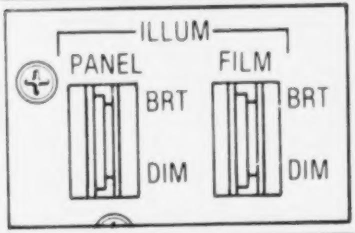

B
A
FT
FOC
DYN
MT
FOC
DYN
ILLUM
PANEL
FILM
BRT
DIM
BRT
DIM
FT DISPLAY
BIAS
VIDEO
MT DISPLAY
BIAS
VIDEO
DEV TEMP
MONITOR MODE
C
D

RECORDER CONTROL PANEL

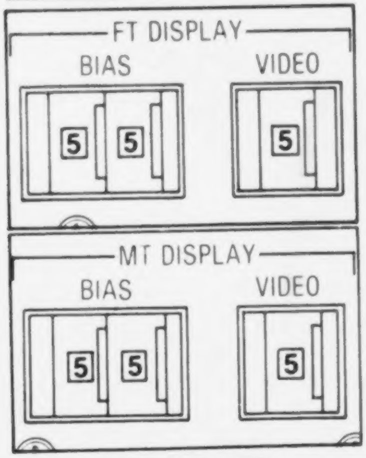
A


FT
FOC
DYN
MT
FOC
DYN

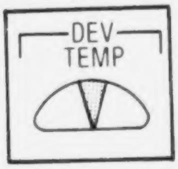
B


ILLUM
PANEL
FILM
BRT
DIM
BRT
DIM

C


FT DISPLAY
BIAS
VIDEO
5
5
5
MT DISPLAY
BIAS
VIDEO
5
5
5

D



FT FOC and DYN, and MT FOC and DYN controls will be adjusted only by direct support or higher, maintenance personnel.

ILLUM controls —
PANEL: Sets brightness of recorder control panel edgelights.
FILM: Sets brightness of film viewing panel lamps.

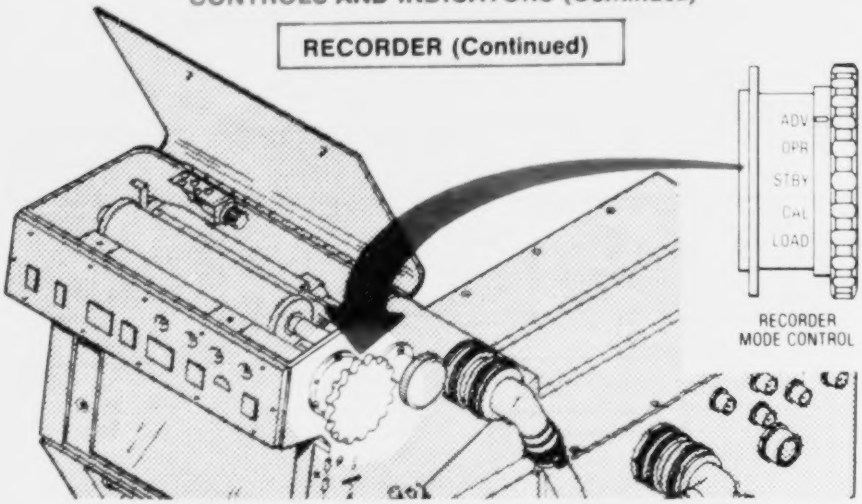
FT. DISPLAY and MT DISPLAY
BIAS: Sets film background gray level. Larger numbers cause darker film background level.

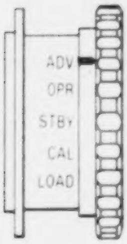
VIDEO — Sets video contrast. Larger numbers cause high contrast; strong returns are very dark and weak returns are very light. FT video is set properly when only the strongest returns are black.

DEV TEMP meter — Indicates relative temperature of film developing heat bar. Heat bar is at proper temperature when pointer is in green. Changes to RANGE, ANTENNA selection and KNOTS GRD SPEED will cause DEV TEMP indicator to show an increase or decrease in temperature.

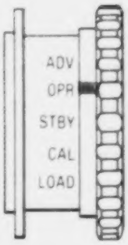
CONTROLS AND INDICATORS (Continued)

RECORDER (Continued)

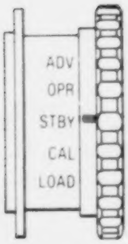

ADV
OPR
STBY
CAL
LOAD
RECORDER MODE CONTROL


ADV
OPR
STBY
CAL
LOAD

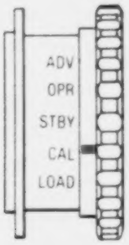
ADV: Rapidly advances film through recorder without recording or processing.


ADV
OPR
STBY
CAL
LOAD

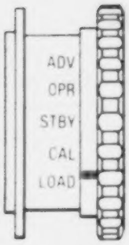
OPR: Power is applied to all recorder circuits for normal operation.


ADV
OPR
STBY
CAL
LOAD

STBY: Film drive and film developing heater circuits are disabled. Power is applied to all other recorder circuits.


ADV
OPR
STBY
CAL
LOAD

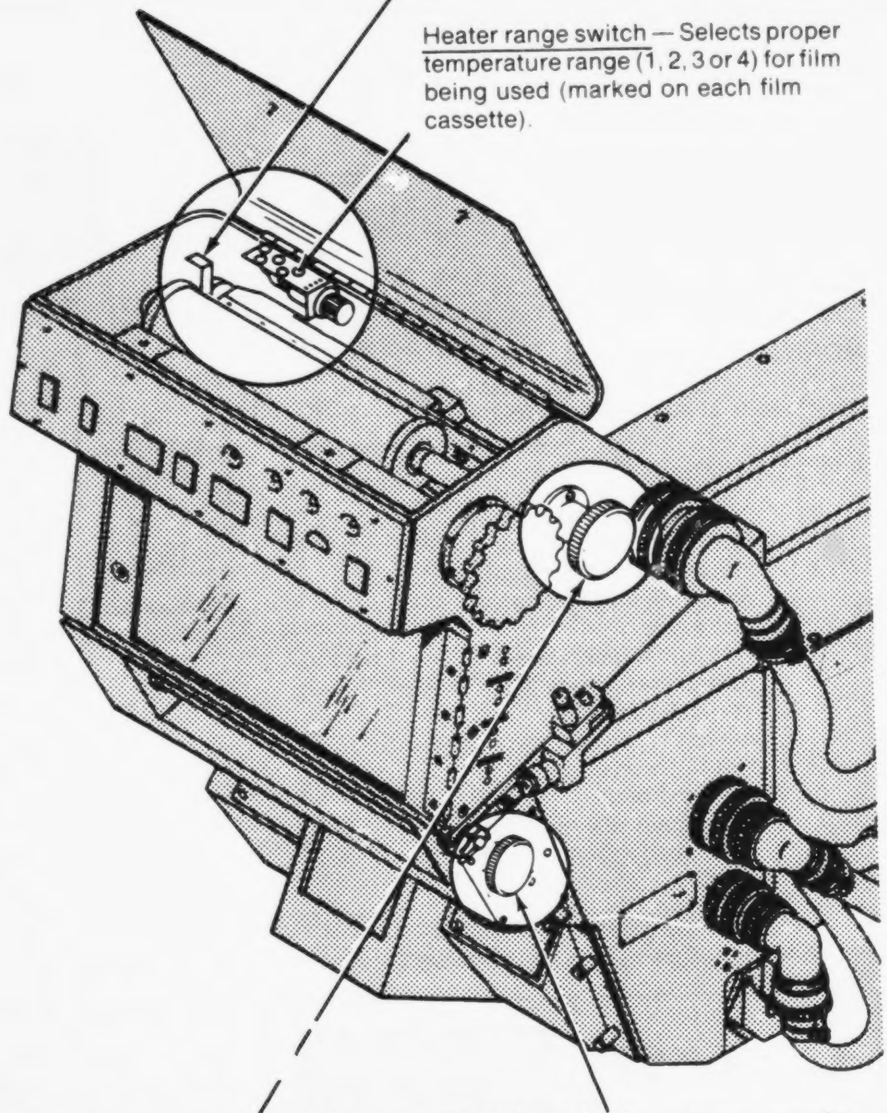
CAL: Used by maintenance personnel for recorder calibration.


ADV
OPR
STBY
CAL
LOAD

LOAD: Disables film drive and film developing heater circuits. It also lifts heater bar to allow loading of film.

CONTROLS AND INDICATORS (Continued)

RECORDER (Continued)



Release lever — Used to disengage upper pinch roller when loading film.

Heater range switch — Selects proper temperature range (1, 2, 3 or 4) for film being used (marked on each film cassette).

Film manual advance knob — Allows operator to turn film drive rollers by hand during film loading.

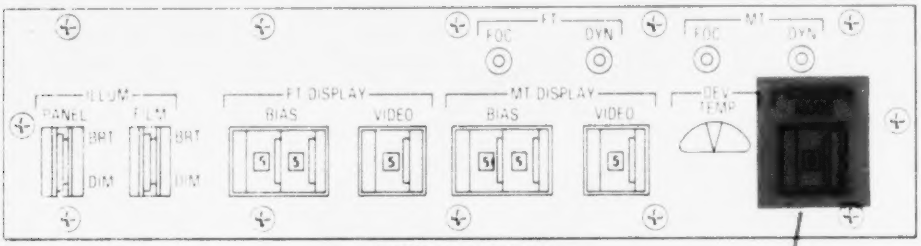
Film takeup knob — Allows operator to turn film takeup rollers by hand during film loading.

CONTROLS AND INDICATORS (Continued)

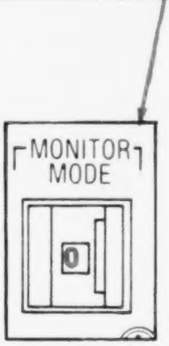
RECORDER (Continued)

MONITOR CRT SUBSYSTEM

Display used to check radar video signal, radar frequency and mt and ft crt alignments, and film speed accuracy.

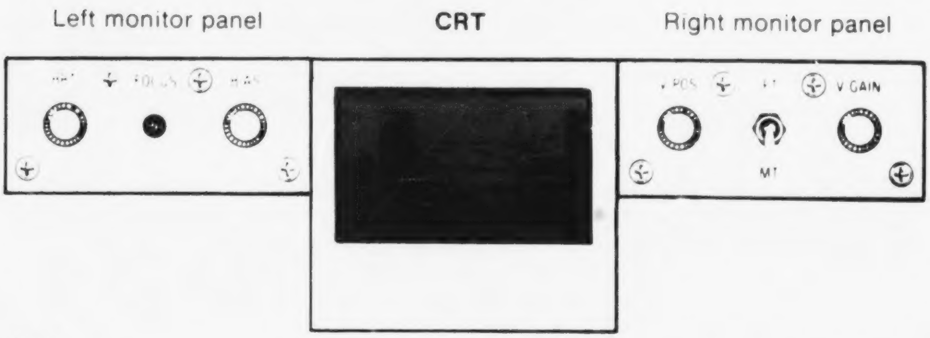

FT
FOC
DYN
MT
FOC
DYN
ILLUM
PANEL
FILM
BRT
DIM
BRT
DIM
FT DISPLAY
BIAS
VIDEO
MT DISPLAY
BIAS
VIDEO
DEV TEMP
5
5
5
5
5
5

RECORDER CONTROL PANEL


MONITOR MODE
0

MONITOR MODE switch: 10-position thumbwheel switch used to select mode of monitor crt as follows:

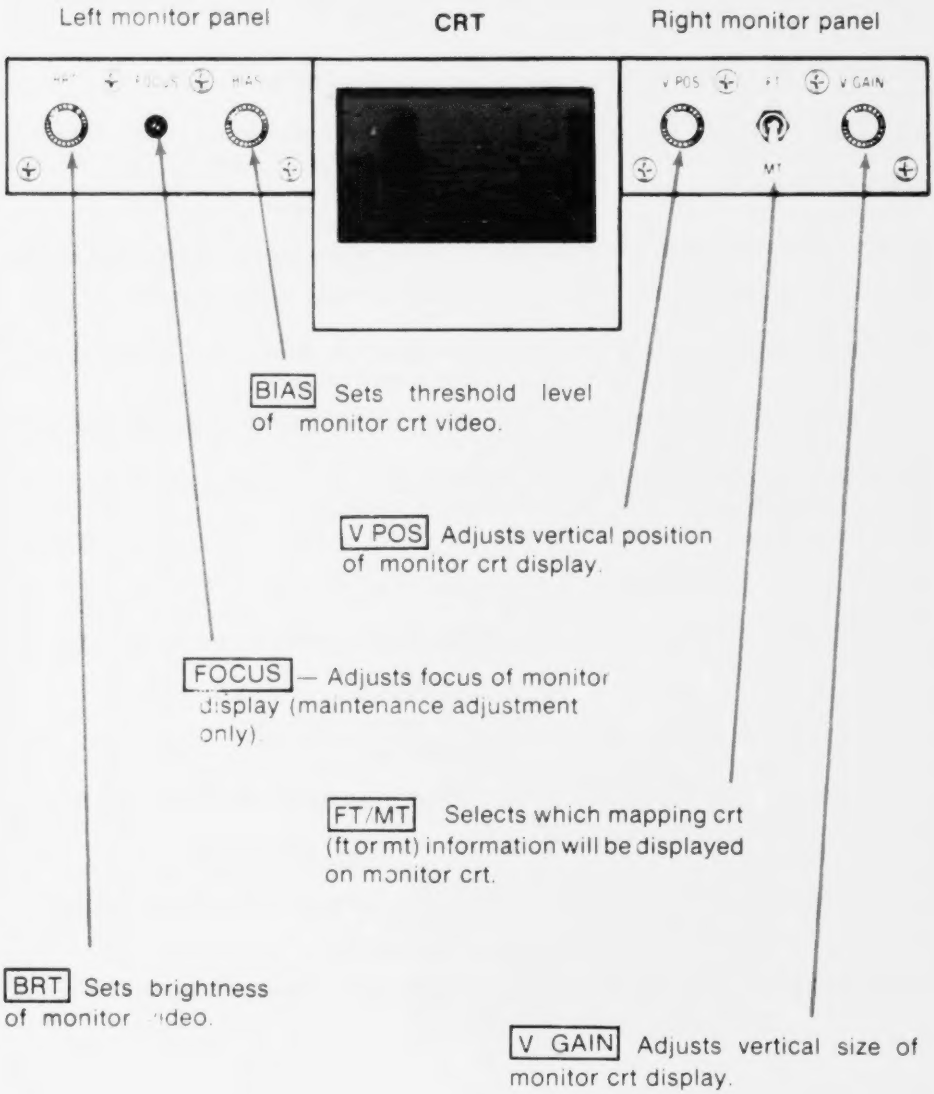
Position	Mode
0	Normal radar mode.
1	SLAR frequency band.
2	Horizontal and vertical centering and vertical test mode.
3	Horizontal gain and balance test mode.
4	Vertical offset test mode.
5	Not functional.
6	Bias test mode.
7	Video gain test mode.
8	Filmspeed monitor mode.
9	Not used.


Left monitor panel
CRT
Right monitor panel
BRT
FOCUS
BIAS
V POS
FT
MT
V GAIN

CONTROLS AND INDICATORS (Continued)

RECORDER (Continued)

MONITOR CRT SUBSYSTEM (Continued)


Left monitor panel
CRT
Right monitor panel
BRT
FOCUS
BIAS
V POS
FT
MT
V GAIN

BIAS Sets threshold level of monitor crt video.

V POS Adjusts vertical position of monitor crt display.

FOCUS — Adjusts focus of monitor display (maintenance adjustment only).

FT/MT Selects which mapping crt (ft or mt) information will be displayed on monitor crt.

BRT Sets brightness of monitor video.

V GAIN Adjusts vertical size of monitor crt display.

SECTION II

PREVENTIVE MAINTENANCE CHECKS AND SERVICES

BE SURE YOUR SLAR WILL OPERATE PROPERLY. ALWAYS PERFORM THE PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS).

BEFORE YOU OPERATE Always keep in mind the CAUTIONS and WARNINGS. Perform your B (before) PMCS.

WHILE YOU OPERATE Always keep in mind the CAUTIONS and WARNINGS. Perform your D (during) PMCS.

AFTER YOU OPERATE Be sure to perform your A (after) PMCS.

IF YOUR SLAR SET FAILS TO OPERATE Report deficiencies on DA form 2407 (Maintenance Request). Use ITEM NO. column in PMCS table, for TM ITEM NO. column on DA form 2404.

WARNING

DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT

Be careful when working around the 115-volt ac line connections or near circuits carrying dc power supply voltages.

EXTREMELY DANGEROUS VOLTAGES EXIST IN THE FOLLOWING UNITS:

Receiver-Transmitter, Radar RT-1283/APS-94F	25,000 volts
Recorder-Processor-Viewer, Radar Mapping RO-495/U	10,000 volts
Generator, Sweep SG-1127/APS-94E	640 volts

ELECTROMAGNETIC RADIATION

DO NOT STAND ALONG SIDE OF ANTENNA WHEN POWER IS ON!

PROPELLER DANGER

EXTREME DANGER FROM AIRCRAFT PROPELLERS.

Severe injury or death may result from coming in contact with rotating propellers.

ALWAYS KEEP CLEAR OF PROPELLER AREAS.

Use an auxiliary power unit (APU) to provide equipment power whenever possible.

DON'T TAKE CHANCES!

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

PERFORM WEEKLY AS WELL AS "BEFORE" OPERATIONS PMCS IF:

① YOU ARE THE ASSIGNED OPERATOR AND HAVE NOT OPERATED THE SLAR SINCE THE LAST WEEKLY.

② YOU ARE OPERATING THE SLAR FOR THE FIRST TIME.

WARNING

DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT

Be certain all aircraft electrical power is off before beginning PMCS checks.

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Continued)

NOTE

Checks in interval column are to be performed in order listed

B—BEFORE OPERATION D—DURING OPERATION A—AFTER OPERATION W—WEEKLY

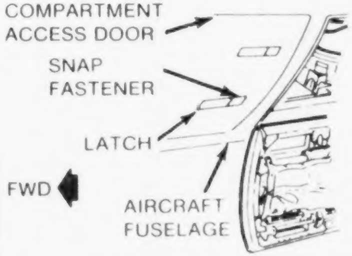
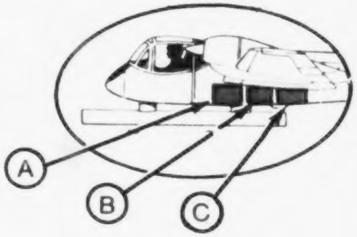
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING, EQUIPMENT IS NOT READY/AVAILABLE IF:
1	B	EQUIPMENT COMPARTMENT ACCESS DOOR	**CAUTION** DO NOT ALLOW HATCH DOOR TO SWING FREE WHEN OPENING. THIS COULD DAMAGE THE AIRCRAFT USE THE ACCESS DOOR OPENING PROCEDURE BELOW TO OPEN THE FOLLOWING EQUIPMENT COMPARTMENT DOORS: NO. 1 MID-SECTION EQUIPMENT COMPARTMENT (A), FORWARD BAGGAGE COMPARTMENT (B), AND NO. 2 MID-SECTION EQUIPMENT COMPARTMENT (C).  COMPARTMENT ACCESS DOOR SNAP FASTENER LATCH FWD AIRCRAFT FUSELAGE  1. PRESS EACH OF THE THREE SNAP FASTENERS. 2. WHILE HOLDING DOOR IN PLACE, GRASP TOP LATCH AND PULL FORWARD. 3. LOWER DOOR UNTIL IT HAS REACHED ITS TRAVEL LIMITS.	DOOR DOES NOT OPEN. ANY DOOR LATCH OR SNAP FASTENER DOES NOT WORK.

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Continued)

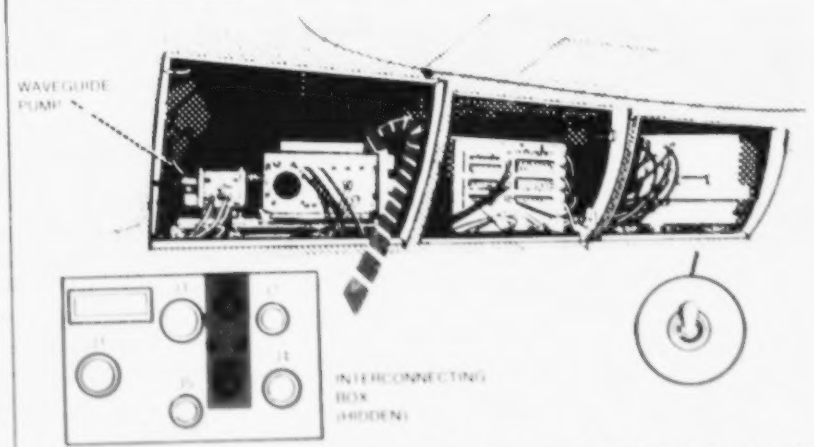
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING, EQUIPMENT IS NOT READY/AVAILABLE IF:
2	B	SLAR COMPONENTS IN MID-SECTION EQUIPMENT COMPARTMENTS	VERIFY THAT ALL SLAR COMPONENTS IN THESE COMPARTMENTS ARE PRESENT AND SECURELY MOUNTED  	ANY SLAR COMPONENTS ARE MISSING OR ARE IMPROPERLY INSTALLED
3	B	CABLE CONNECTIONS	CHECK ALL INTERCONNECTING CABLE AND WAVEGUIDE CONNECTIONS OF SLAR COMPONENTS. ALL CONNECTIONS SHOULD BE SECURE	ANY CABLE OR WAVEGUIDE CONNECTOR CAN NOT BE SECURELY FASTENED
4	B	CIRCUIT BREAKERS	CHECK ALL SLAR CIRCUIT BREAKERS IN EQUIPMENT BAY. RESET ANY TRIPPED CIRCUIT BREAKERS	ANY CIRCUIT BREAKER CAN NOT BE SET

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Continued)

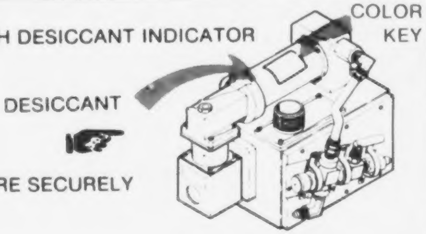
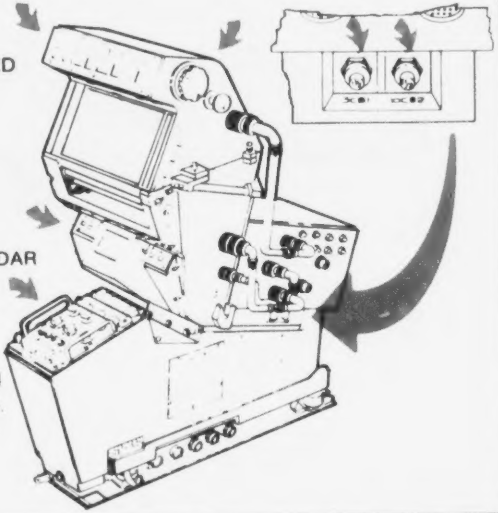
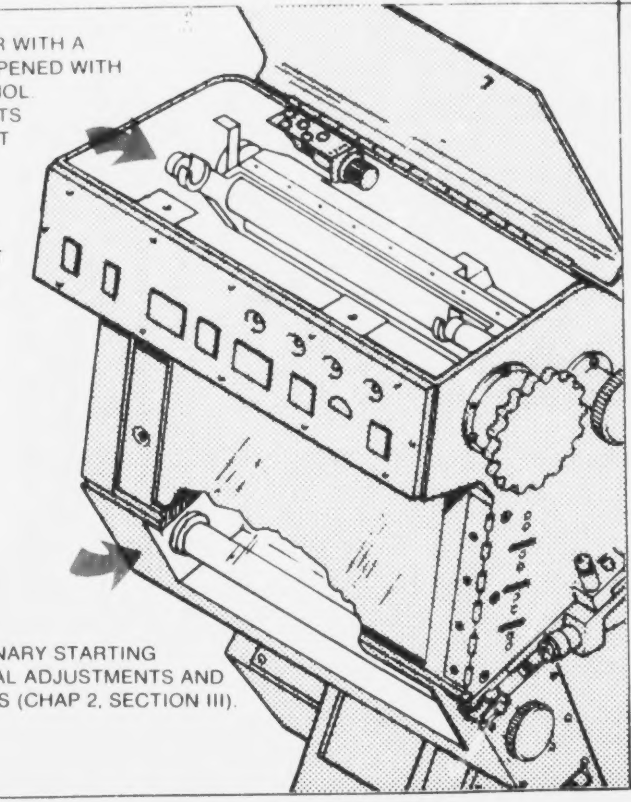
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING, EQUIPMENT IS NOT READY/AVAILABLE IF:
5	B A	WAVE-GUIDE PUMP DESICCANT	COMPARE COLOR OF DESICCANT WITH DESICCANT INDICATOR COLOR KEY. 	COLOR OF DESICCANT INDICATES IT IS NO LONGER EFFECTIVE.
6	B	COCKPIT COMPLEX COMPONENTS	BE SURE ALL CABLE CONNECTORS ARE SECURELY FASTENED.	CONNECTORS CAN NOT BE SECURELY FASTENED.
7	B	RECORDER CIRCUIT BREAKERS	CHECK RECORDER CIRCUIT BREAKERS. RESET ANY TRIPPED BREAKERS. 	EITHER CIRCUIT BREAKER CAN NOT BE SET.
8	B	CONTROLS AND INDICATORS	CHECK CONDITION OF ALL RADAR CONTROL AND RECORDER CONTROLS AND INDICATORS. BE SURE NO INDICATORS OR CONTROLS ARE BROKEN, LOOSE, OR BINDING. TIGHTEN ANY LOOSE CONTROL KNOBS.	ANY CONTROLS OR INDICATORS NEEDED FOR MISSION ARE INOPERATIVE.

TABLE 2-1. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (Continued)

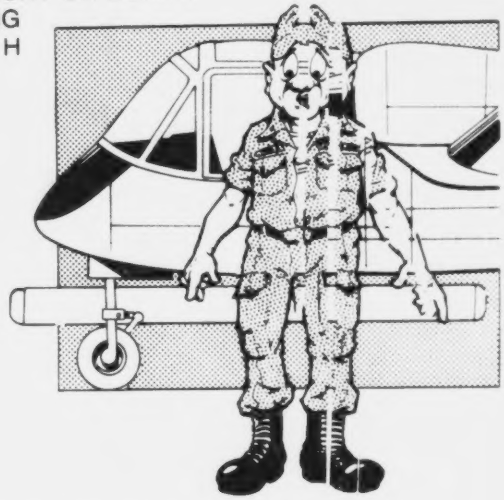
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING, EQUIPMENT IS NOT READY/AVAILABLE IF:
9	B A	FILM TRANSPORT ROLLERS.	CLEAN FILM ROLLER WITH A CLEAN CLOTH DAMPENED WITH DENATURED ALCOHOL. CHECK COMPONENTS OF FILM TRANSPORT SYSTEM FOR DAMAGE, OR FOR ANY CONDITION THAT COULD ADVERSELY AFFECT SLAR OPERATION. 	CONDITION OF FILM TRANSPORT SYSTEM COULD ADVERSELY AFFECT MISSION PERFORMANCE.
10	B W	SLAR PERFORMANCE	PERFORM PRELIMINARY STARTING PROCEDURE, INITIAL ADJUSTMENTS AND PREFLIGHT CHECKS (CHAP 2, SECTION III).	ANY CONDITION DISCOVERED DURING PREFLIGHT CHECK COULD HAVE AN ADVERSE EFFECT ON MISSION PERFORMANCE.

SECTION III

OPERATION UNDER USUAL CONDITIONS

WARNING

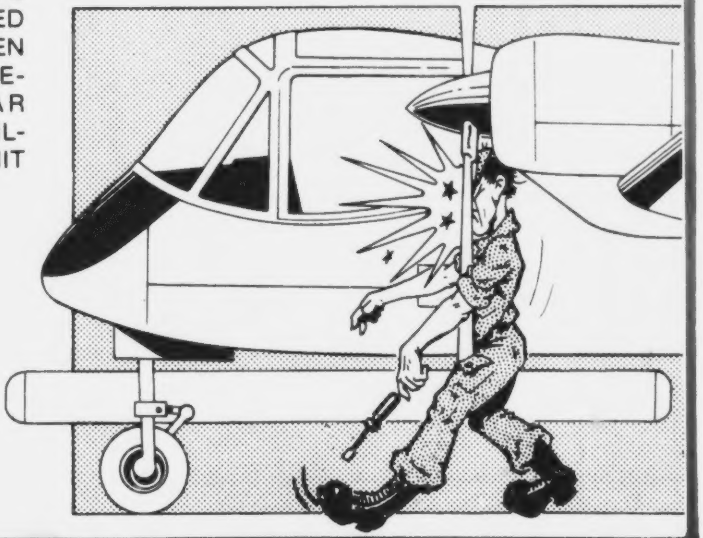
EXTREME DANGER FROM AIRCRAFT PROPELLERS. SEVERE INJURY OR DEATH MAY RESULT FROM COMING IN CONTACT WITH ROTATING PROPELLERS.



ALWAYS KEEP CLEAR OF PROPELLER AREAS.

WARNING

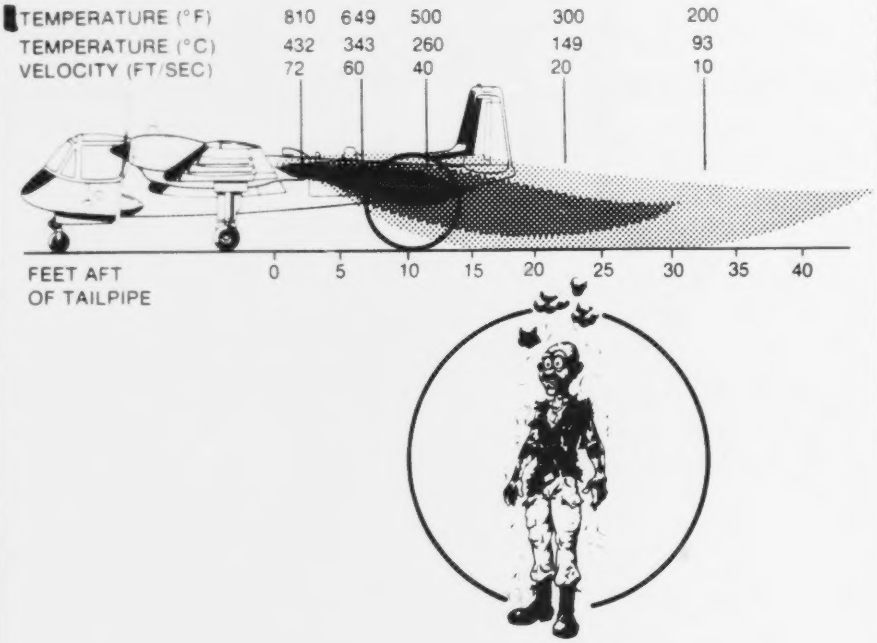
DO NOT GO THROUGH PROPELLER AREAS EVEN WHEN PROPELLERS ARE NOT TURNING. IN DOING SO, YOU MAY DEVELOP A HABIT THAT COULD PROVE FATAL IN A RUSHED SITUATION. WHEN POSSIBLE, PREFLIGHT SLAR USING AN AUXILIARY POWER UNIT (APU).



WARNING

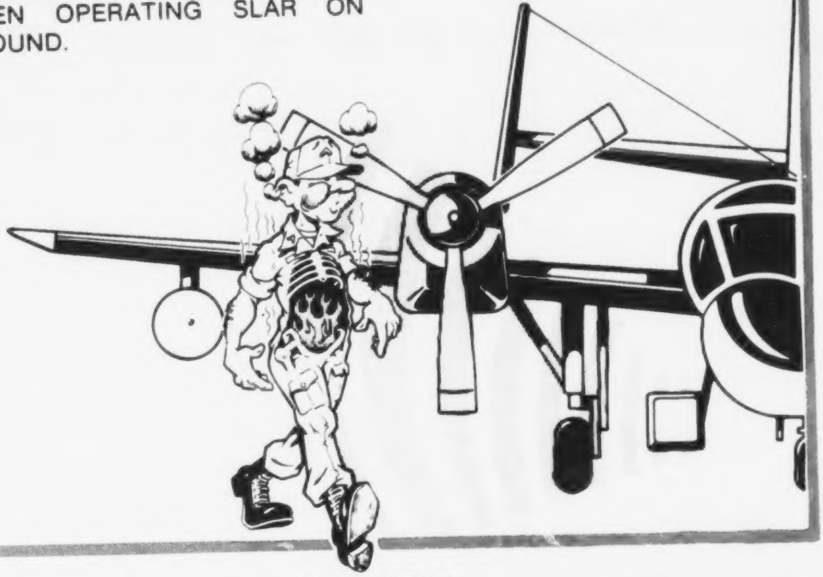
DO NOT GO BEHIND ROTATING PROPELLERS! YOU CAN BE SEVERELY BURNED BY HOT ENGINE EXHAUST!

GROUND IDLE

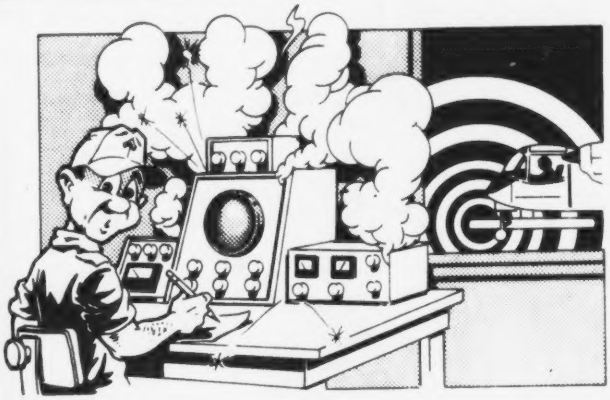

TEMPERATURE (°F) 810 649 500 300 200
TEMPERATURE (°C) 432 343 260 149 93
VELOCITY (FT/SEC) 72 60 40 20 10
FEET AFT OF TAILPIPE
0 5 10 15 20 25 30 35 40

WARNING

BE SURE ALL PERSONNEL ARE CLEAR OF SIDES OF ANTENNA WHEN OPERATING SLAR ON GROUND.



CAUTION



DO NOT OPERATE SLAR NEAR OTHER RADAR SETS. ALSO, DO NOT OPERATE SLAR IN OR NEAR BUILDINGS OR OTHER LARGE STRUCTURES.

PRELIMINARY STARTING PROCEDURE

BEFORE STARTING EQUIPMENT

Perform all of the B (before) PMCS, if you have not already done so (Section II).

PRELIMINARY SETTINGS

Set controls of SLAR as shown in table 2-2.

Table 2-2. Preliminary Control Settings

Component	Control	Setting
Radar Control	POWER	OFF
	XMTR	STBY
	ANT	LOCK
	FILTER	LO
	PRF	RANDOM
	NAV	MAN
	RESIDUE	5
	ANTENNA	BOTH
	RANGE	50
	DELAY	0
	KNOTS GRD SPD	225
	DEG DRIFT	1.7° R
	XMTR FREQ	6
Recorder	Recorder mode control	STBY
	BIAS (both)	55
	VIDEO (both)	5
	MONITOR MODE	0
	MONITOR FT/MT	FT

EQUIPMENT STARTING

ON REMOTE C/B PANEL . . . VERIFY APS-94 CIRCUIT BREAKERS ARE SET

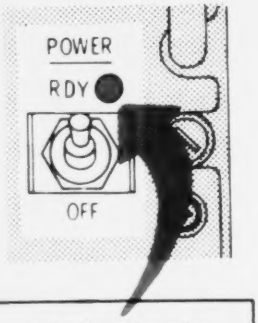
Connect auxiliary power to aircraft. Start and operate auxiliary power equipment in accordance with the applicable technical manuals.

Check cockpit indicator to be sure input power is 28 V ±4V dc. Turn on aircraft inverters 1, 2 and 3.

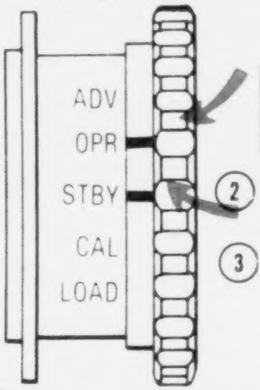
PREFLIGHT CHECK

CAUTION

Be certain sweep generator air intakes are not blocked.


POWER
RDY
OFF

① Set radar control POWER switch to RDY. RDY indicator will blink until waveguide is fully pressurized and then turn black. RDY indicator turns white after 3-minute time-in and full pressurization.


ADV
OPR
STBY
CAL
LOAD

NOTE

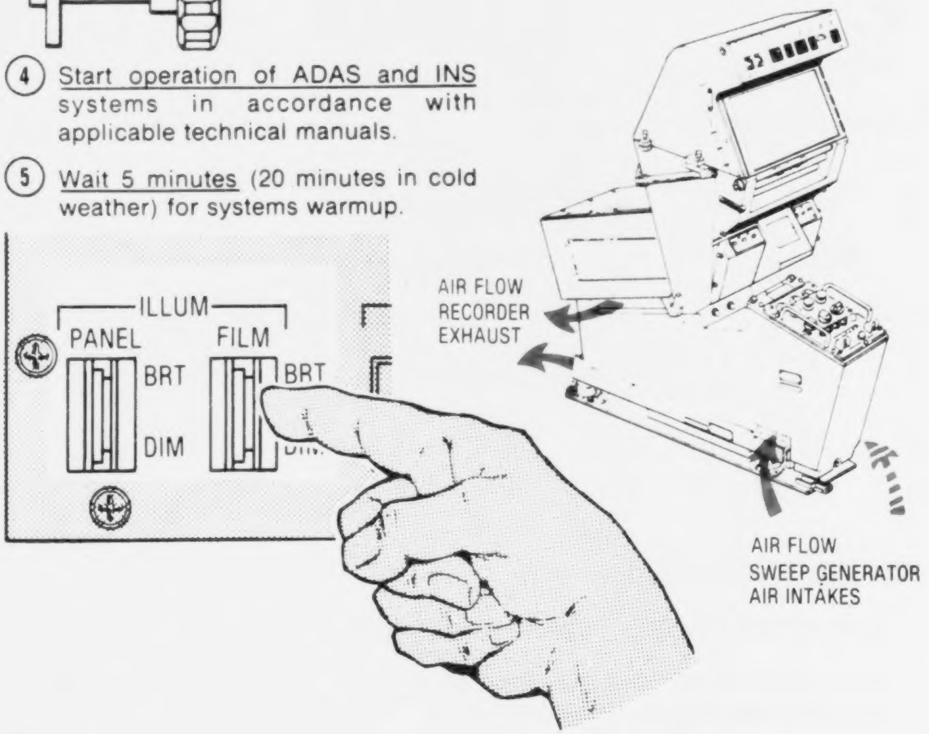
Disregard BITE fail indications until after time-in and BITE check (performed later).

② Set recorder mode control to OPR, then back to STBY.

③ Verify that air is blowing out at recorder exhaust, and being drawn in at sweep generator air intakes.

④ Start operation of ADAS and INS systems in accordance with applicable technical manuals.

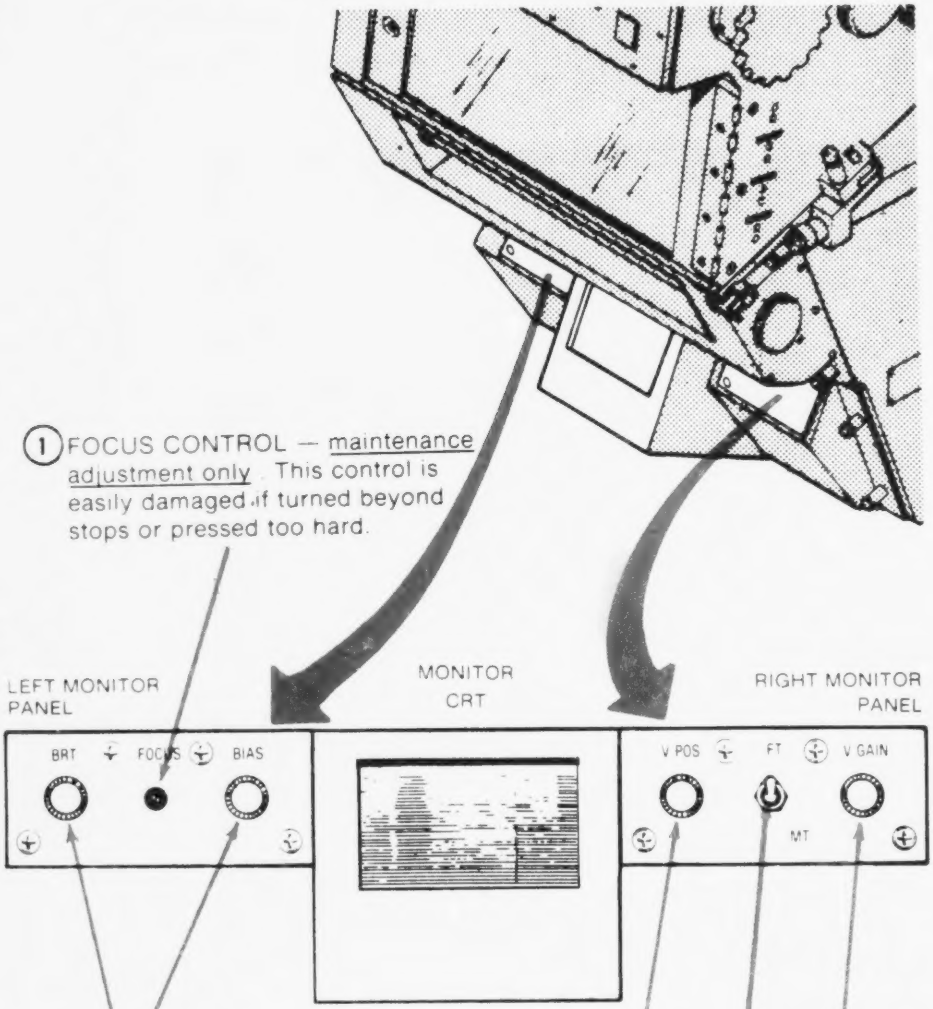
⑤ Wait 5 minutes (20 minutes in cold weather) for systems warmup.


ILLUM
PANEL
BRT
DIM
FILM
BRT
DIM
AIR FLOW
RECORDER
EXHAUST
AIR FLOW
SWEEP GENERATOR
AIR INTAKES

⑥ Adjust recorder PANEL and FILM ILLUM controls for desired illumination of edge lighted panels and even illumination of film viewing panel.

PREFLIGHT CHECK (Continued)

MONITOR CRT ADJUSTMENT


LEFT MONITOR PANEL
MONITOR CRT
RIGHT MONITOR PANEL
BRT
FOCUS
BIAS
V POS
FT
V GAIN
MT

① FOCUS CONTROL — maintenance adjustment only. This control is easily damaged if turned beyond stops or pressed too hard.

② Adjust BIAS and BRT controls to get the brightness you want.

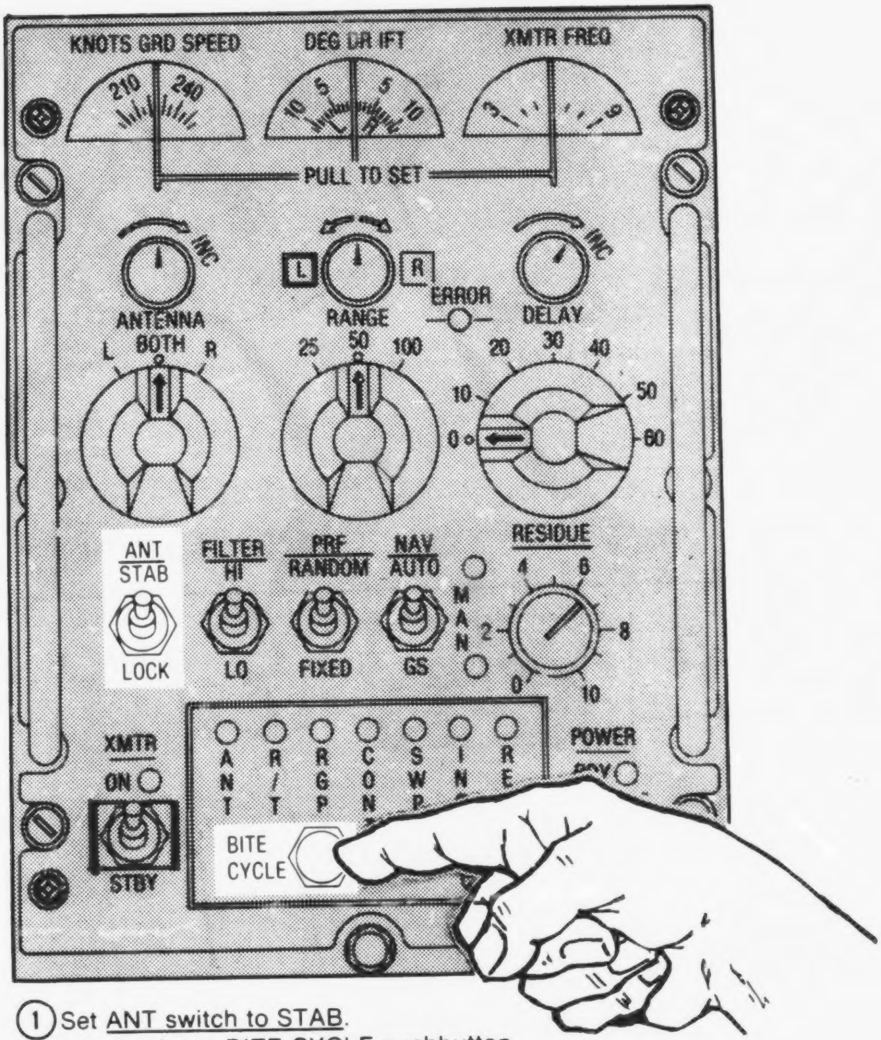
③ Adjust V POS to place reference lines in lower part of display.

④ Set to FT.

⑤ Set V GAIN fully clockwise.

PREFLIGHT CHECK (Continued)

BITE CHECK


KNOTS GRD SPEED
210
240
DEG DRIFT
10
5
5
10
XMTR FREQ
3
9
PULL TO SET
INC
ANTENNA
L
RANGE
R
ERROR
DELAY
INC
L
BOTH
R
25
50
100
20
30
40
10
50
0
60
ANT
STAB
LOCK
FILTER
HI
LO
PRF
RANDOM
FIXED
NAV
AUTO
GS
MAN
RESIDUE
4
6
2
8
0
10
XMTR
ON
STBY
ANT
R/T
RGP
CONT
SWP
INS
RE
POWER
RDY
BITE
CYCLE

① Set ANT switch to STAB.
Press and release BITE CYCLE pushbutton.

NORMAL INDICATIONS:

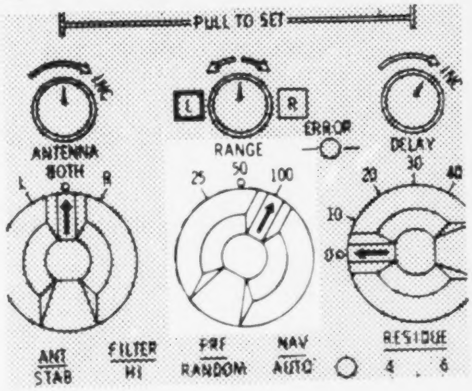
ANT indicator blinks for a few seconds after BITE CYCLE pushbutton is pressed, then turns black. CYCLING indicator is white during BITE CYCLE test (approximately two minutes), and turns black at end of test. All BITE indicators remain black when CYCLING indicator turns black.

② Set ANT switch to LOCK.

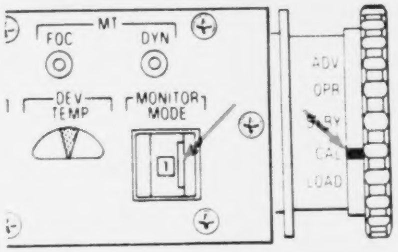
PREFLIGHT CHECK (Continued)

PAN DISPLAY CHECK

① Set RANGE control to 100.


PULL TO SET
INC
ANTENNA
BOTH
L
R
RANGE
ERROR
DELAY
INC
25
50
100
10
20
30
40
00
ANT
STAB
FILTER
HI
PRF
RANDOM
NAV
AUTO
RESIDUE
4
6

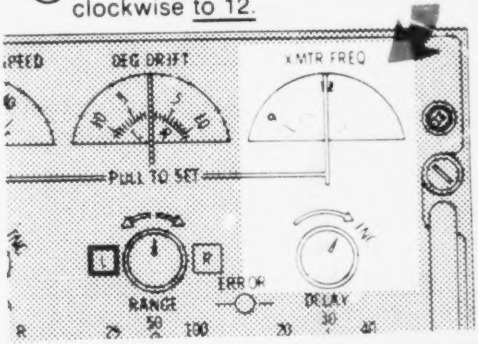
② Set recorder mode control to CAL and MONITOR MODE switch to 1.


MT
FOC
DYN
1
DEV
TEMP
MONITOR
MODE
1
ADV
OPR
STBY
CAL
LOAD

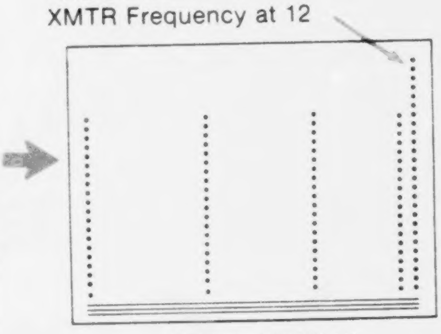
NOTE

XMTR frequency marker may be taller than stationary markers.

③ Turn XMTR FREQ control switch clockwise to 12.


SPEED
DEG DRIFT
XMTR FREQ
12
0
PULL TO SET
INC
L
R
RANGE
ERROR
DELAY
INC
25
50
100
20
30
40

FREQUENCY Marker
XMTR Frequency at 12

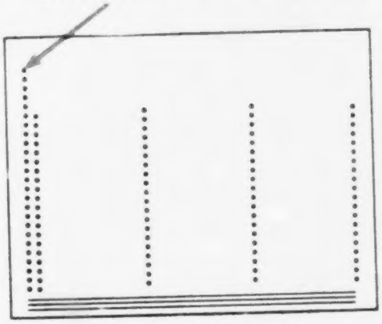


MONITOR DISPLAY

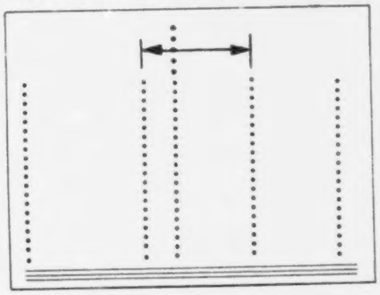
④ If monitor display is as shown, set XMTR FREQ control back to 0.

⑤ Return XMTR FREQ to 6. XMTR frequency marker is located between center most stationary markers.

FREQUENCY MARKER
XMTR FREQUENCY AT 0



MONITOR DISPLAY



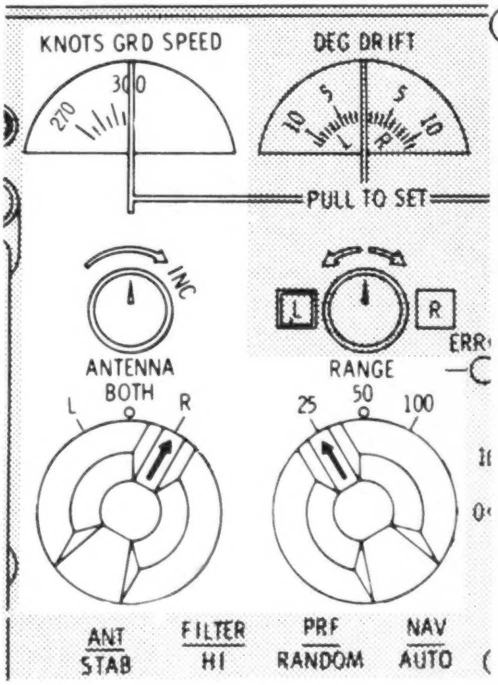
MONITOR DISPLAY

NOTE

Other frequency markers may appear if SLAR is receiving other signals.

PREFLIGHT CHECK (Continued)

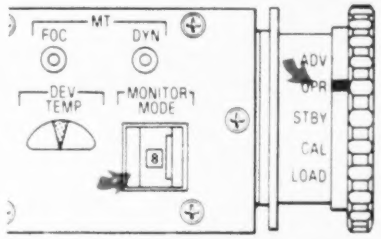
FILM SPEED ACCURACY - TEST 1


KNOTS GRD SPEED
270
300
DEG DRIFT
10
5
L
R
5
10
PULL TO SET
INC
ANTENNA
BOTH
L
R
L
R
RANGE
25
50
100
ERR
ANT
STAB
FILTER
HI
PRF
RANDOM
NAV
AUTO

① SETTINGS:

KNOTS GRD SPEED - 300
ANTENNA - R
RANGE - 25
RECORDER MONITOR MODE
- 8

Recorder mode control to OPR

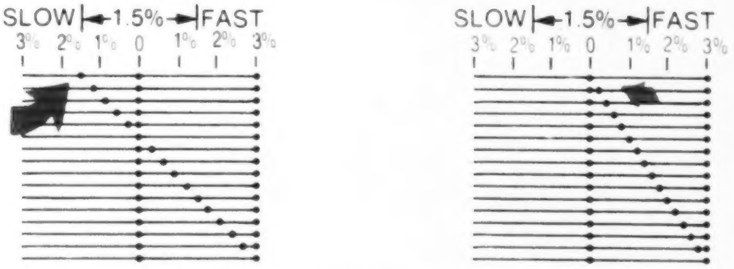

MT
FOC
DYN
DEV TEMP
MONITOR MODE
8
ADV
OPR
STBY
CAL
LOAD

② Adjust monitor crt BIAS to get horizontal lines on monitor crt.

③

While observing monitor crt, adjust KNOTS GRD SPEED control to obtain correct film speed presentation as shown below.

④ Verify KNOTS GRD SPEED dial indicates 300.


SLOW
1.5%
FAST
3%
2%
1%
0
1%
2%
3%
SLOW
1.5%
FAST
3%
2%
1%
0
1%
2%
3%

FILM SPEED 1.5% TOO SLOW

CORRECT FILM SPEED

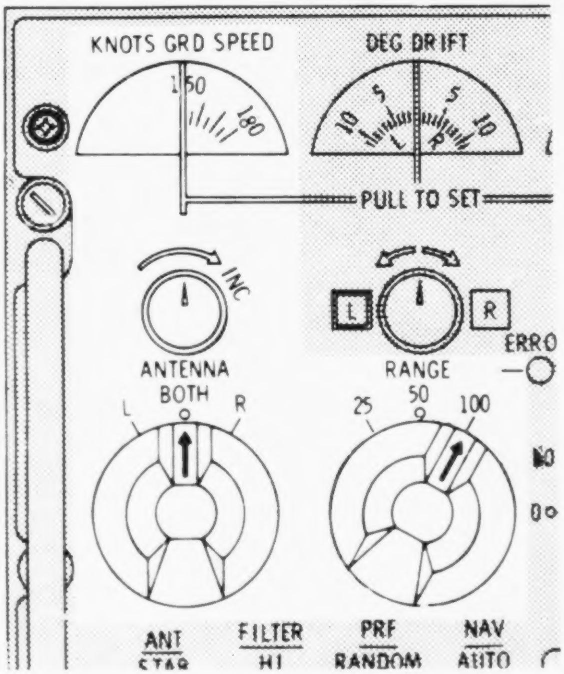
MONITOR CRT PRESENTATION

PREFLIGHT CHECK (Continued)

FILM SPEED ACCURACY - TEST 2

① SETTINGS:

KNOTS GRD SPEED - 150
ANTENNA - BOTH
RANGE - 100


KNOTS GRD SPEED
150
180
DEG DRIFT
10
5
5
10
L
R
PULL TO SET
INC
L
R
ERRO
ANTENNA
BOTH
L
R
RANGE
25
50
100
ANT
STAB
FILTER
HI
PRF
RANDOM
NAV
AUTO

②

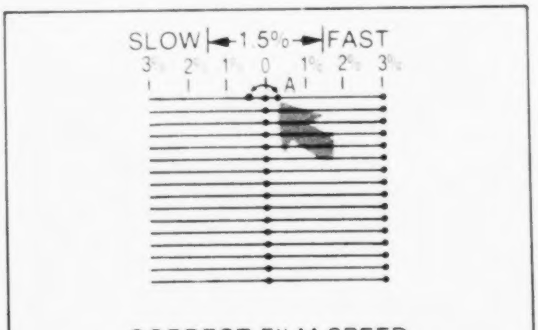
While observing monitor crt, adjust KNOTS GRD SPEED control to obtain Correct Film Speed presentation, as shown below.

NOTE

Film speed indicator dot will normally jump around center position.

③

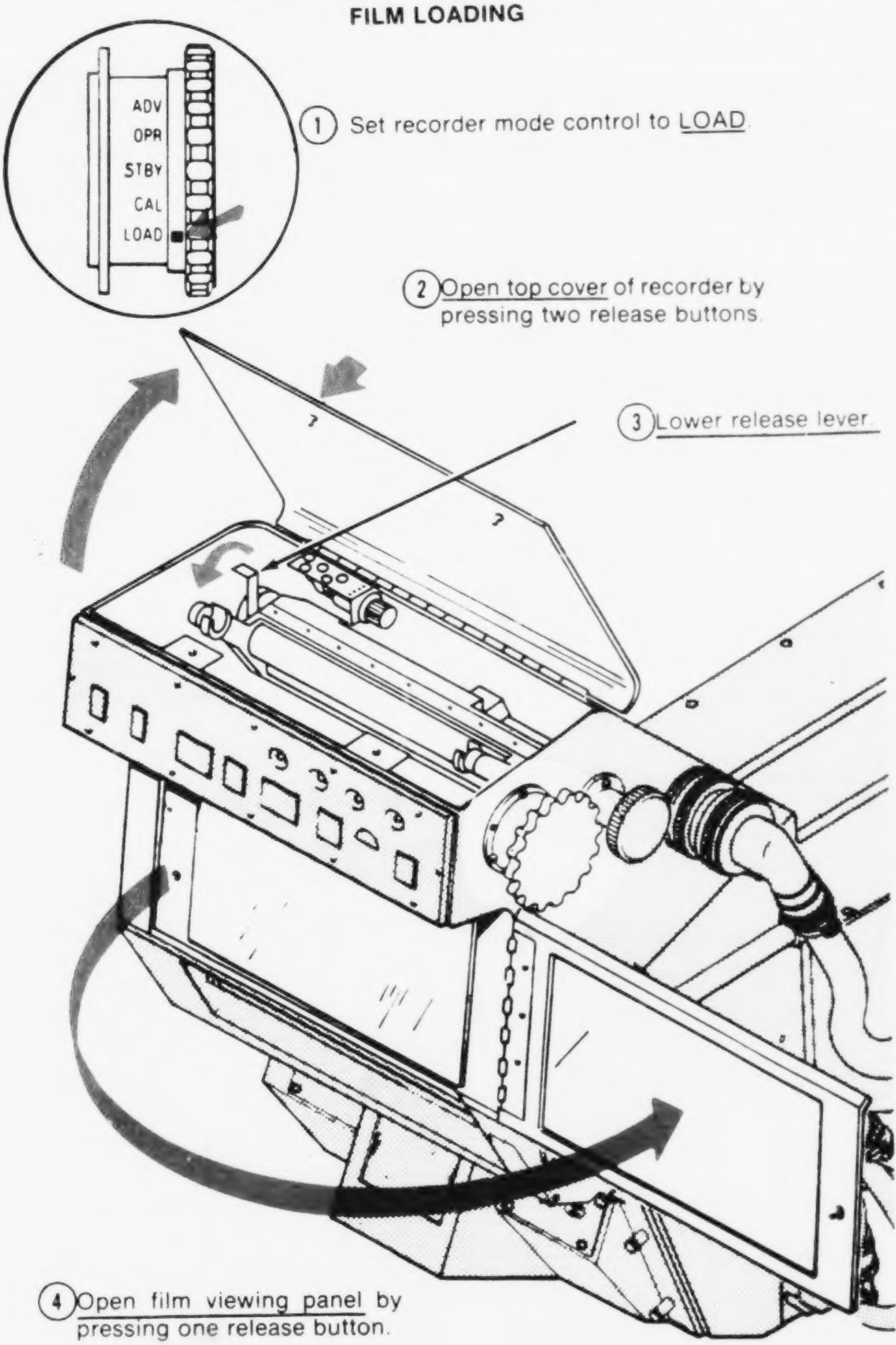
Verify KNOTS GRD SPEED dial indicates 150, exactly.


SLOW
1.5%
FAST
3%
2%
1%
0
1%
2%
3%
A

CORRECT FILM SPEED

PREFLIGHT CHECK (Continued)

FILM LOADING



① Set recorder mode control to LOAD.

② Open top cover of recorder by pressing two release buttons.

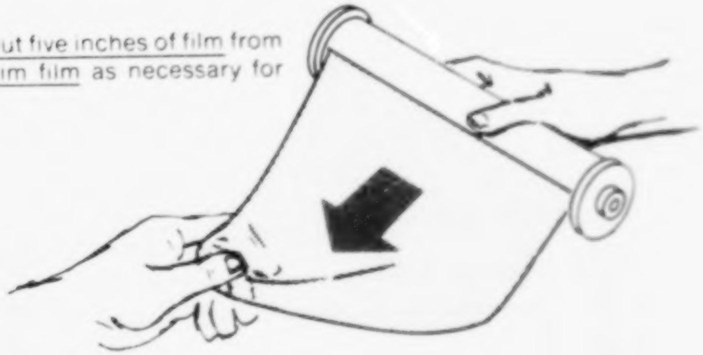
③ Lower release lever.

④ Open film viewing panel by pressing one release button.

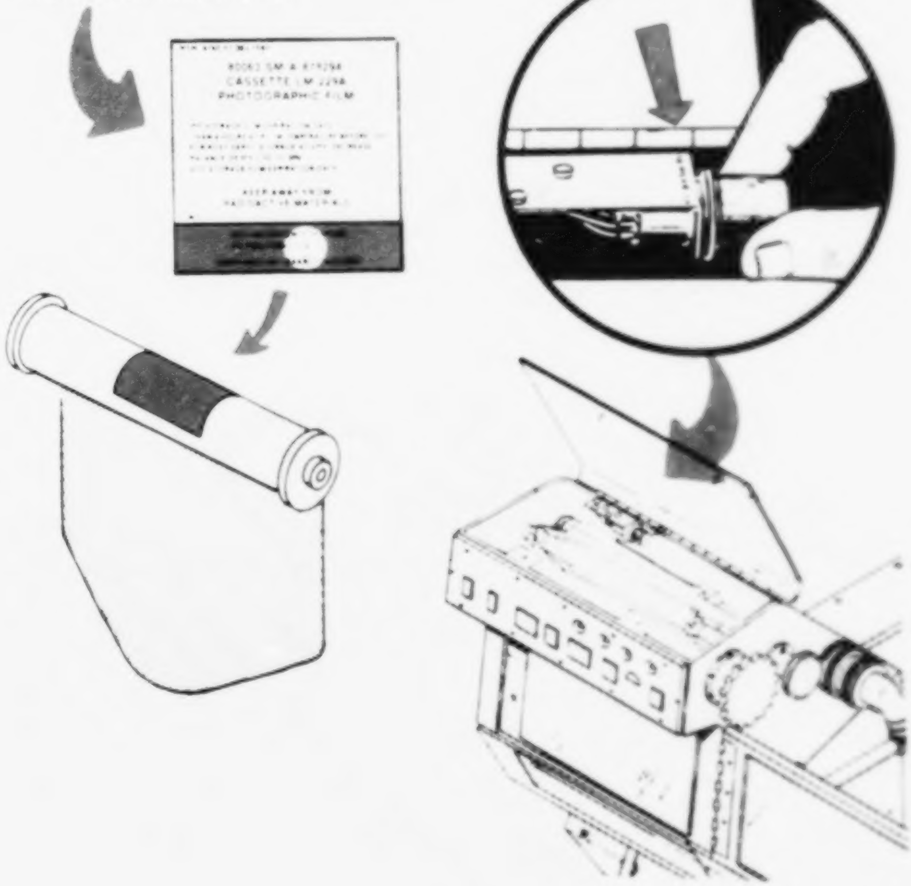
PREFLIGHT CHECK (Continued)

FILM LOADING (Continued)

⑤ Pull out about five inches of film from cassette. Trim film as necessary for loading.

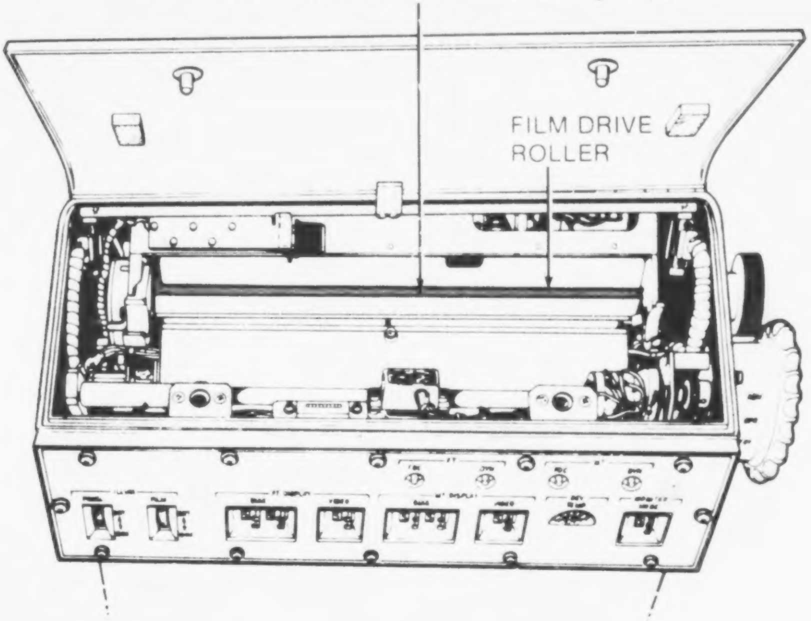


⑥ Set heater range switch to number marked on film cassette.


CASSETTE LM 229A
PHOTOGRAPHIC FILM
KEEP AWAY FROM
RADIOACTIVE MATERIALS

PREFLIGHT CHECK (Continued)

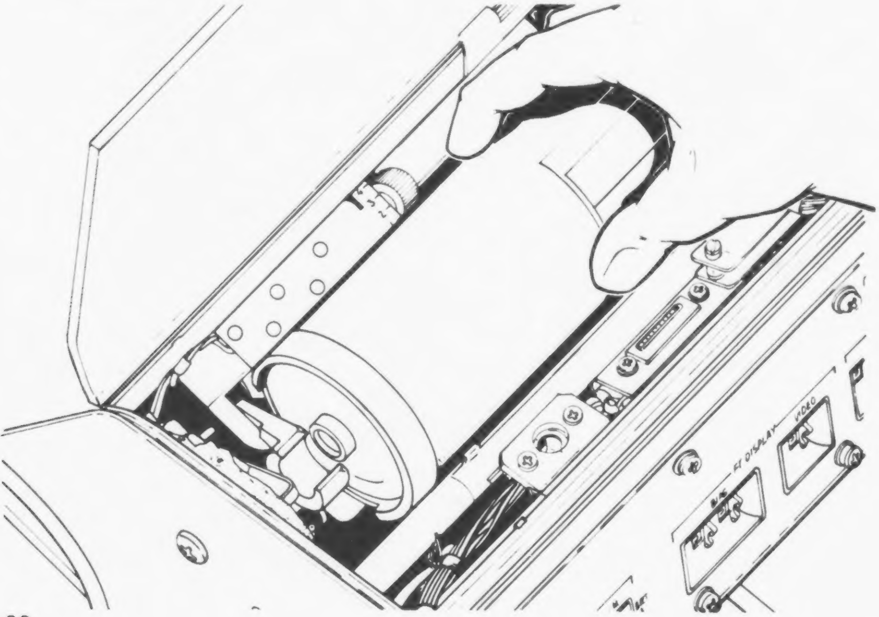
FILM LOADING (Continued)



Film is fed into this slot in the following steps.

FILM DRIVE
ROLLER

(7) Position cassette so that flanged end is to the left and place in slotted cassette holder.



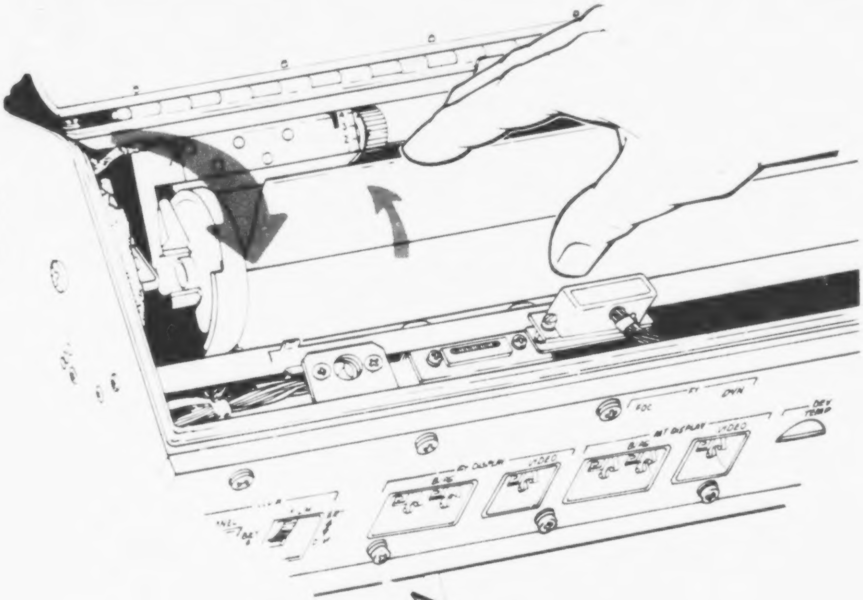
FT DISPLAY
VIDEO

PREFLIGHT CHECK (Continued)

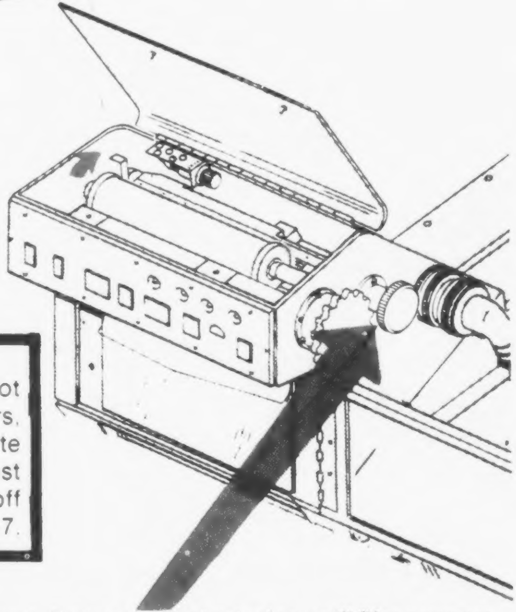
FILM LOADING (Continued)

⑧ Roll cassette toward recorder face (counterclockwise) as far as possible.

⑨ Push film into film loading slot. Continue to feed film until it becomes hard to push.



⑩ Raise release lever.



NOTE

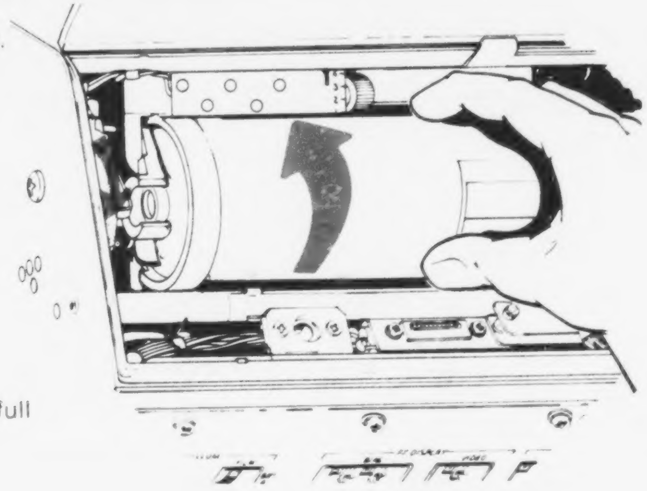
In step 11, film may wrinkle and not appear at top of panel. If this occurs, lower release lever and rotate cassette back. Press film against cassette and remove. Cut off wrinkled film and start over at step 7.

⑪ Push in film manual advance knob. Rotate knob clockwise until film appears at top of viewing panel.

PREFLIGHT CHECK (Continued)

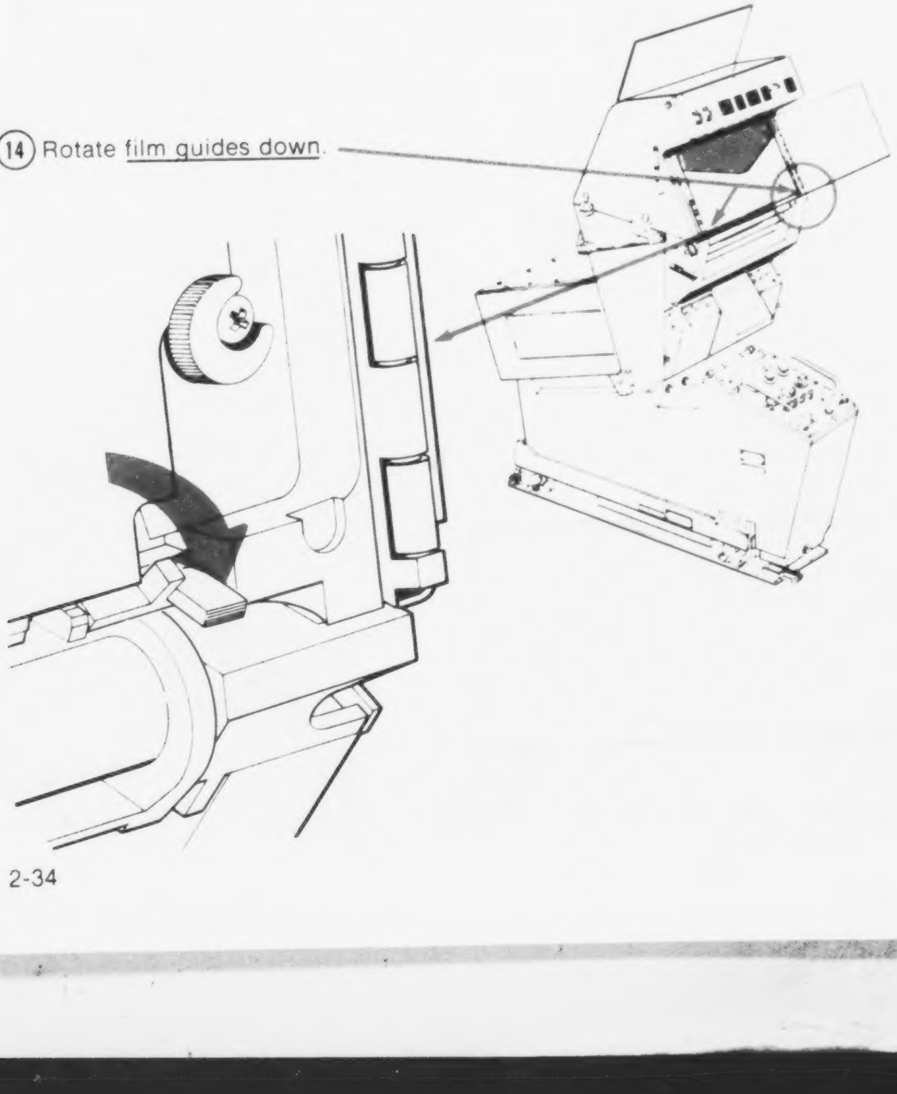
FILM LOADING (Continued)

(12) Lower release lever.



(13) Rotate cassette to full forward position.

(14) Rotate film guides down.

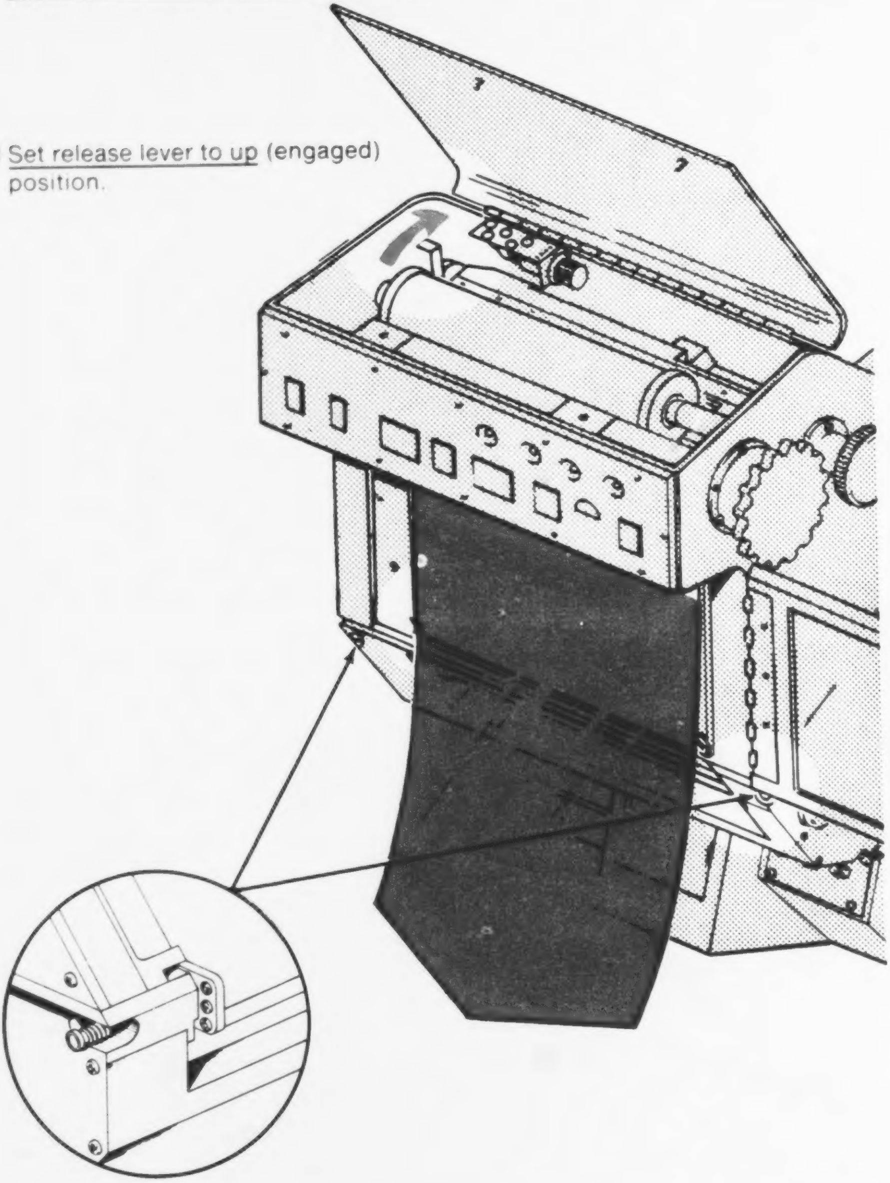


PREFLIGHT CHECK (Continued)

FILM LOADING (Continued)

⑮ Pull down evenly on both sides of film until film reaches monitor scope. Be sure film is aligned within film guides.

⑯ Set release lever to up (engaged) position.

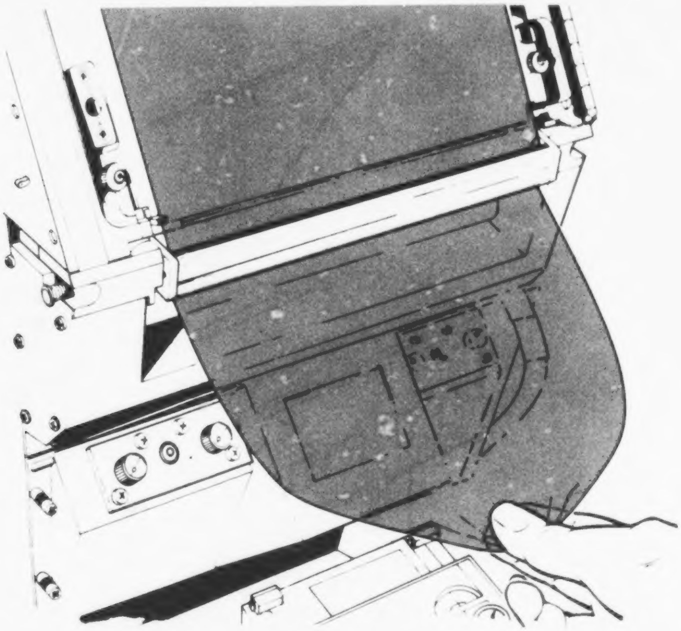


⑰ Release lower pinch roller by pressing release buttons at each end of magazine housing at the same time.

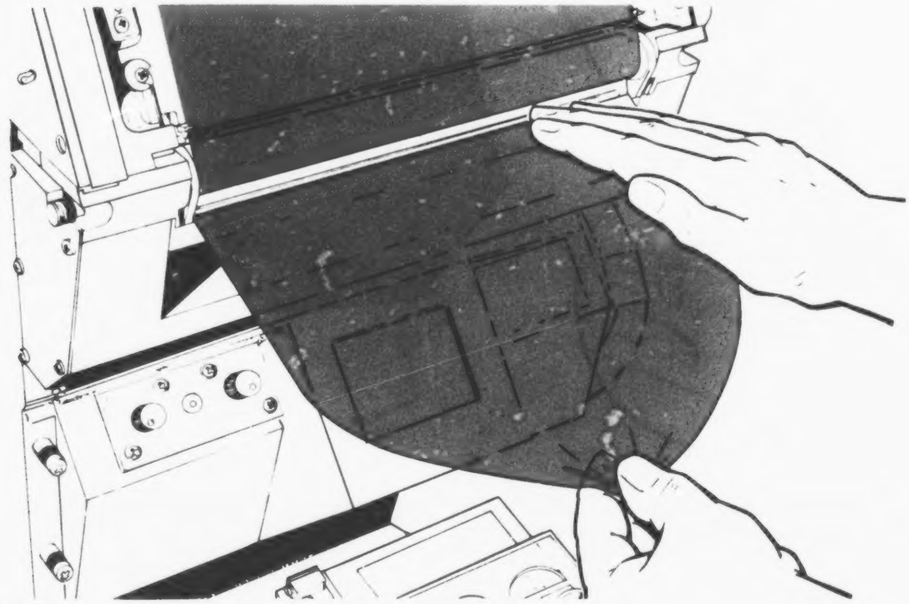
PREFLIGHT CHECK (Continued)

FILM LOADING (Continued)

(18) Feed film through guide bar assembly and behind takeup roller.



(19) While holding film taut and evenly aligned (check film edges at film guides), push in on guide bar until it snaps into place.



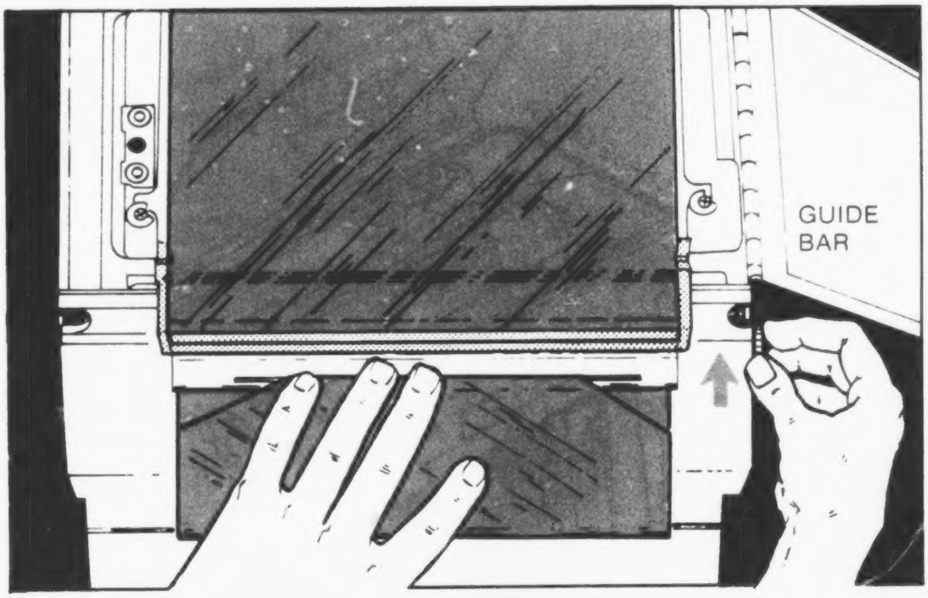
PREFLIGHT CHECK (Continued)

FILM LOADING (Continued)

⑳ Turn takeup knob clockwise until slot in spool is facing outward.

CAUTION

Never turn takeup knob counterclockwise. To do so could damage takeup gear assembly.

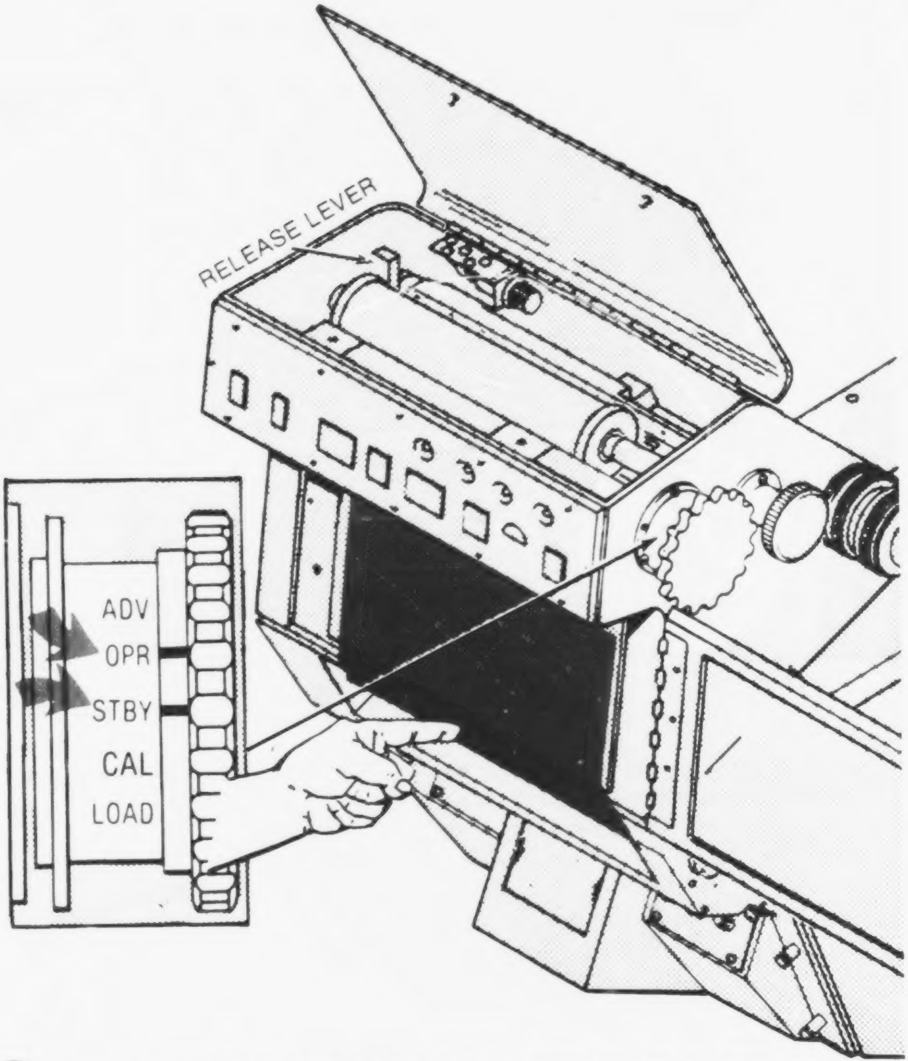


㉑ Insert film into slot of takeup spool. Turn takeup knob clockwise to roll several turns of film onto takeup spool.

PREFLIGHT CHECK (Continued)

FILM LOADING (Continued)

(22) Recheck centering of film. If not centered, lower release lever and set recorder mode control to OPR momentarily. Then, return mode control to STBY and raise release lever.

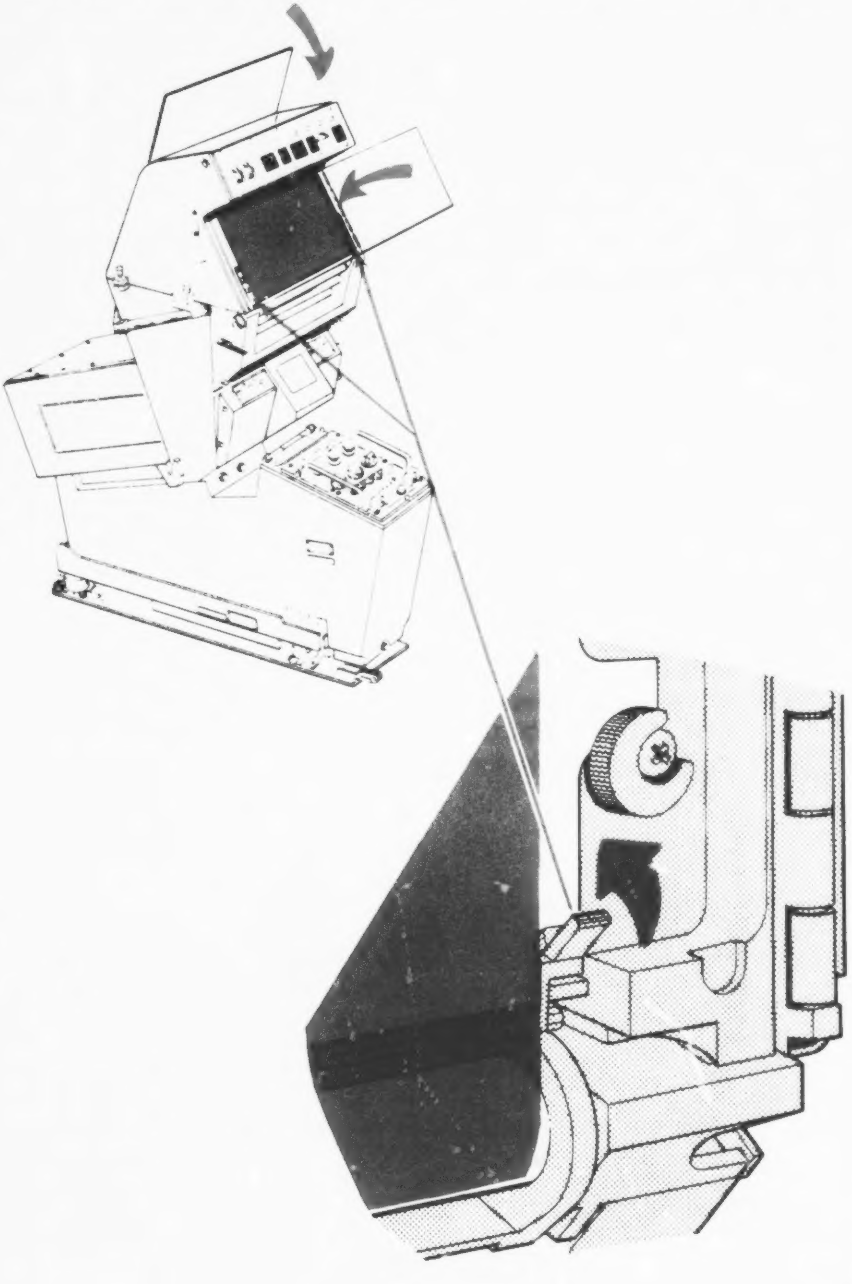


(23) Set mode control to OPR. Check film for even tension by pressing with finger across groove at bottom of film viewing panel. If film is loose on either side, repeat step 22.

PREFLIGHT CHECK (Continued)

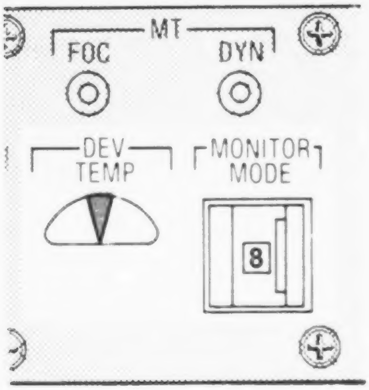
FILM LOADING (Continued)

(24) Rotate film guides up. Close recorder top cover and film viewing panel cover. Be sure both are securely latcned.



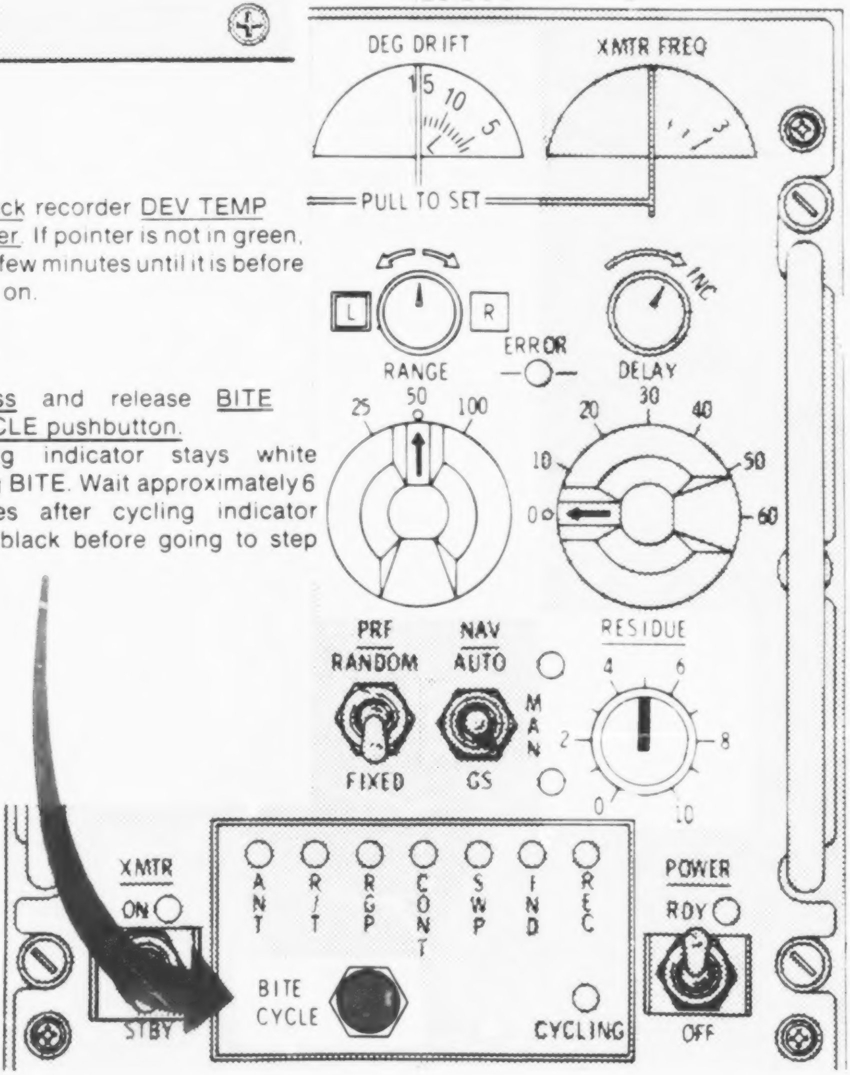
PREFLIGHT CHECK (Continued)

OPERATIONAL CHECK


MT
FOC
DYN
DEV TEMP
MONITOR MODE
8

① Set recorder mode control to ADV momentarily to move film down about 6 inches. Then set mode control to OPR.

② SETTINGS:
GND SPEED — 300
DEG DRIFT — 15° L
XMTR FREQ — 0
ANT — BOTH
RANGE — 50
RESIDUE — 5


DEG DRIFT
15
10
5
L
XMTR FREQ
3
PULL TO SET
L
R
RANGE
ERROR
DELAY
INC
25
50
100
10
20
30
40
50
60
0
PRF
RANDOM
FIXED
NAV
AUTO
MAN
GS
RESIDUE
2
4
6
8
0
10
XMTR
ON
STBY
ANT
R/T
RGP
CONT
SWP
FND
REC
BITE CYCLE
CYCLING
POWER
RDY
OFF

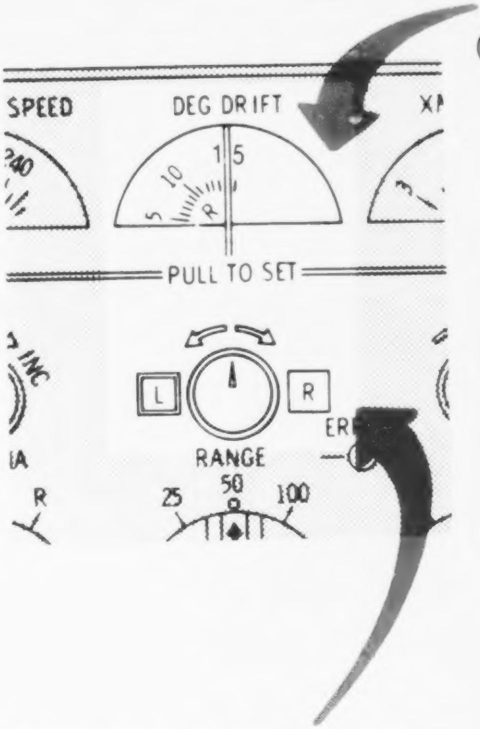
③ Check recorder DEV TEMP meter. If pointer is not in green, wait a few minutes until it is before going on.

④ Press and release BITE CYCLE pushbutton. Cycling indicator stays white during BITE. Wait approximately 6 minutes after cycling indicator turns black before going to step 5.

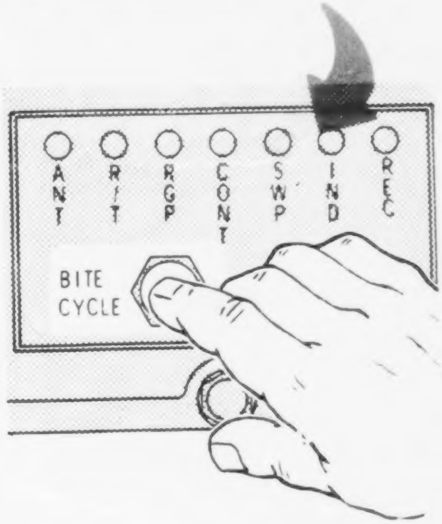
PREFLIGHT CHECK (Continued)

OPERATIONAL CHECK (Continued)

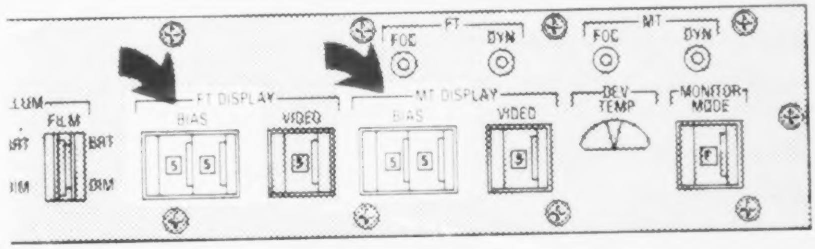
⑤ Set DEG DRIFT to 15° R.


SPEED
DEG DRIFT
15
10
5
R
PULL TO SET
L
R
RANGE
25
50
100

⑥ Press and release BITE CYCLE pushbutton. Wait approximately 6 minutes after CYCLING indicator goes out before going to step 7.


ANT
R/T
RGP
CONT
SWP
IND
REC
BITE CYCLE

⑦ Set DEG DRIFT to 1.7° R. Set FT BIAS and MT BIAS switches to 65, then return both BIAS switches to 55.

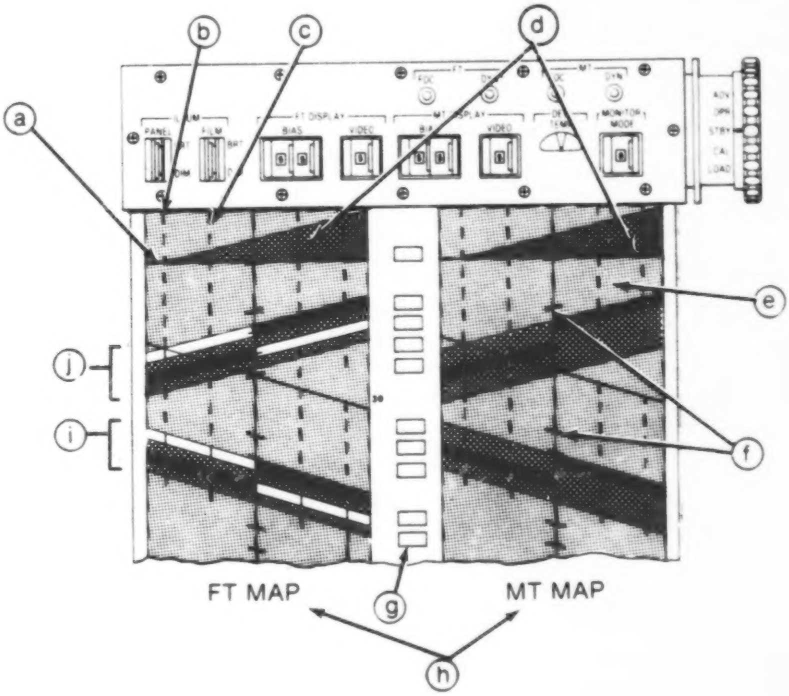

FT
MT
FOC
DYN
FOC
DYN
FILM
BRT
DIM
FT DISPLAY
BIAS
VIDEO
MT DISPLAY
BIAS
VIDEO
DEV TEMP
MONITOR MODE

PREFLIGHT CHECK (Continued)

OPERATIONAL CHECK (Continued)

⑧ When horizontal line ⓐ below, becomes visible in viewing panel, set recorder mode control to STBY.

⑨ Inspect test patterns in viewing panel. Check items ⓐ through ⓙ on MT and FT maps. Make sure all items called out in illustration are as shown.


ⓑ
ⓒ
ⓓ
ⓐ
ⓔ
ⓙ
ⓘ
ⓕ
FT
MT
FOC
DYN
ILLUM
PANEL
FILM
FT DISPLAY
BIAS
VIDEO
MT DISPLAY
MONITOR MODE
ADV
OPR
STBY
CAL
LOAD
FT MAP
MT MAP
ⓖ
ⓗ

ⓐ Lines on MT and FT films should be parallel to upper edge of viewing panel.

ⓑ 40 km range marks modulated with 30 sec timing marks.

ⓒ 20 km range marks modulated with 30 sec timing marks.

ⓓ Spacing between 20 km and 40 km range markers should appear equal on both maps.

ⓔ Uniform gray level across film.

ⓕ Fiducial marks.

ⓖ ADAS data block.

ⓗ Check film for vertical white or black streaks. Streaks indicate a loss of video and could adversely affect your mission.

ⓘ Pattern A; 15° L drift

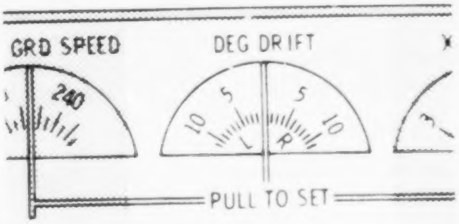
ⓙ Pattern B; 15° R drift

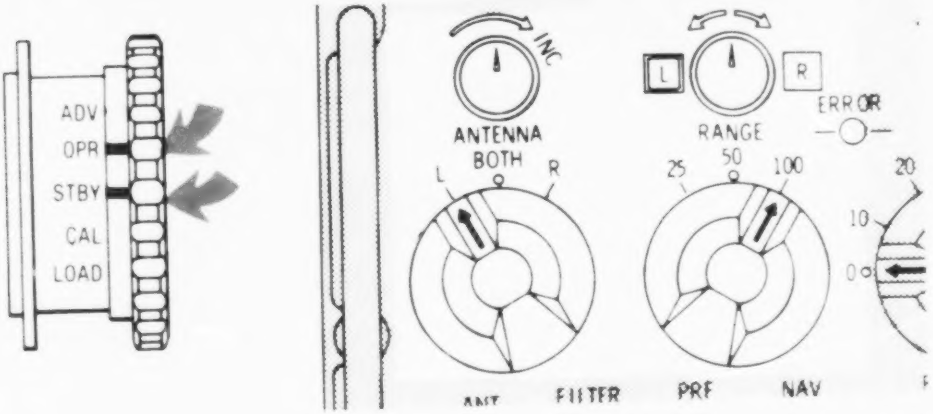
PREFLIGHT CHECK (Continued)

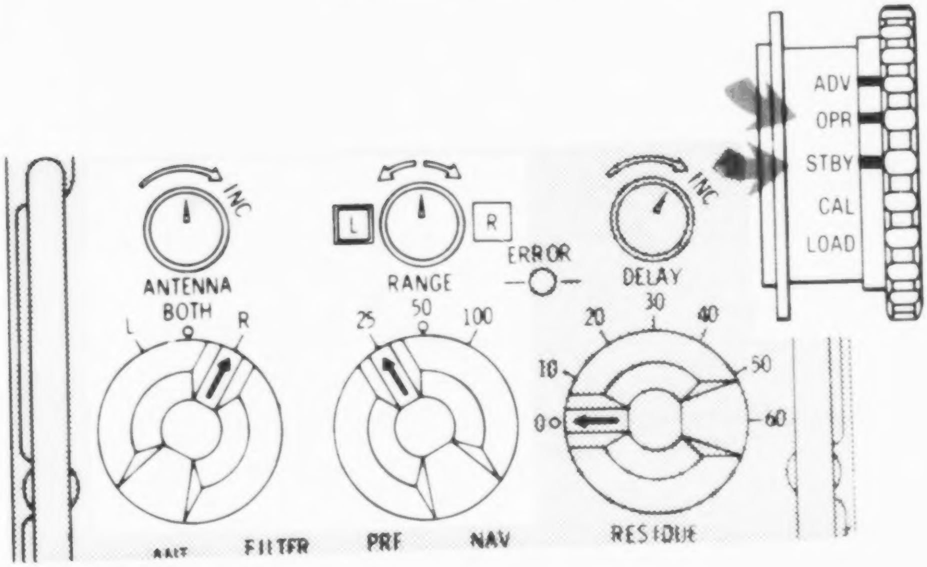
FORMAT CHECK

CONDITION 1

Set ANTENNA to L, RANGE to 100, DEG DRIFT to 0 and recorder mode control to OPR. After about 4 minutes set mode control to STBY.


GRD SPEED
240
DEG DRIFT
10
5
5
10
L
R
PULL TO SET


ADV
OPR
STBY
CAL
LOAD
INC
ANTENNA
BOTH
L
R
RANGE
L
R
ERROR
25
50
100
20
10
0
ANT
FILTER
PRF
NAV


ADV
OPR
STBY
CAL
LOAD
INC
ANTENNA
BOTH
L
R
RANGE
L
R
25
50
100
ERROR
INC
DELAY
20
30
40
10
50
0
60
RESIDUE
ANT
FILTER
PRF
NAV

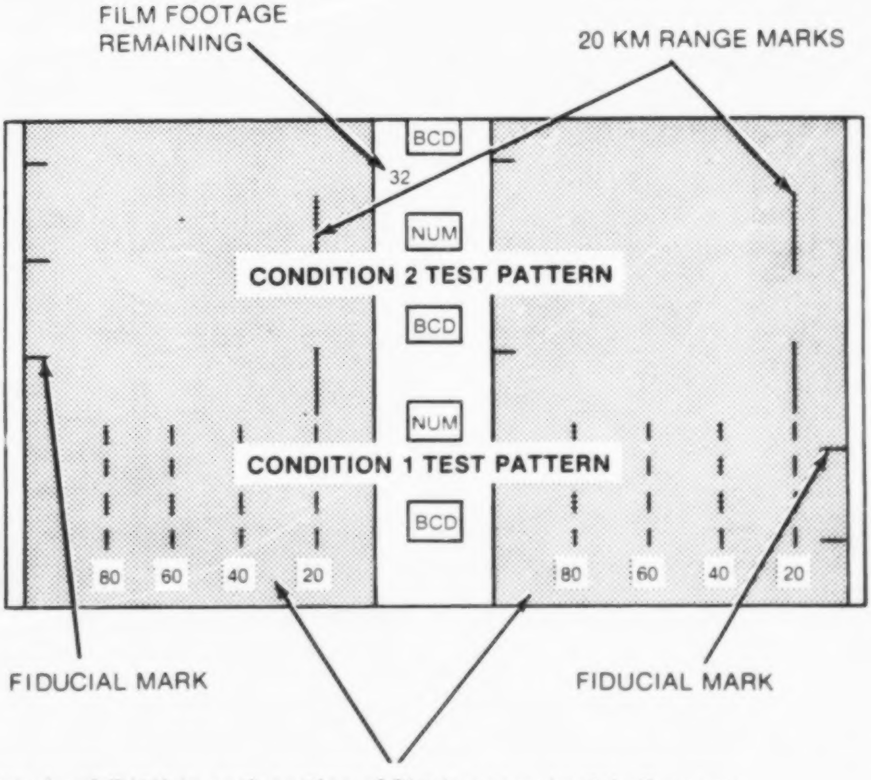
CONDITION 2

Set ANTENNA to R, and RANGE to 25. When DEV TEMP indicator returns to green, set recorder mode control to OPR. When condition 1 test pattern (next page) reaches bottom of viewing panel, set mode control to STBY.

PREFLIGHT CHECK (Continued)

FORMAT CHECK (Continued)

Check condition 1 and condition 2 test patterns. Make sure all of the items called out are presented as shown in the illustrations.


FILM FOOTAGE REMAINING
20 KM RANGE MARKS
BCD
32
NUM
CONDITION 2 TEST PATTERN
BCD
NUM
CONDITION 1 TEST PATTERN
BCD
80
60
40
20
80
60
40
20
FIDUCIAL MARK
FIDUCIAL MARK

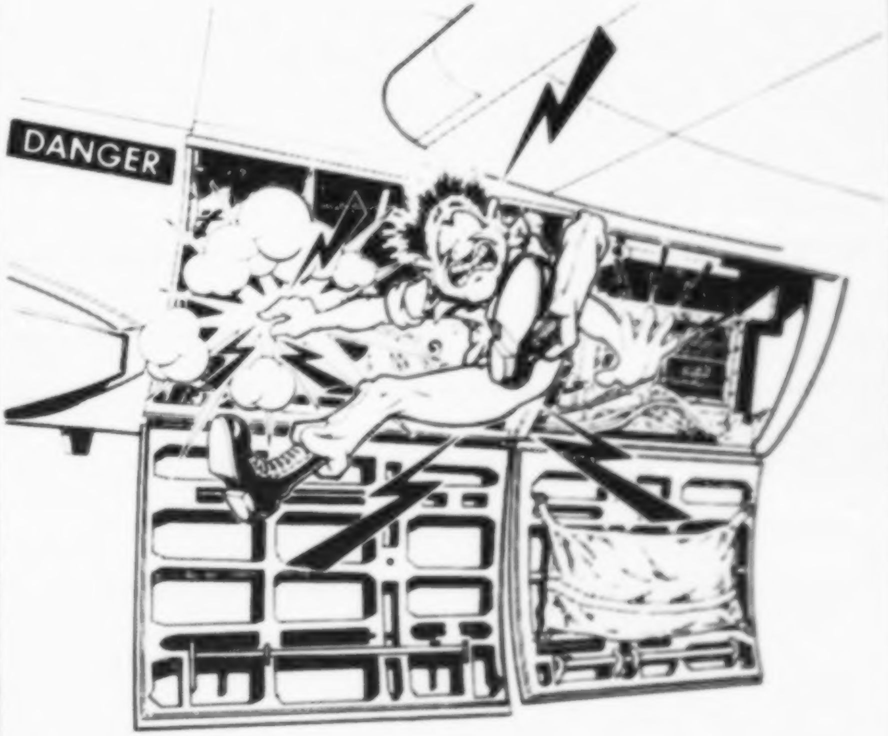
Gray level (bias) in each section of film is approximately the same.

PRESSURIZATION CHECKS

WARNING

DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT

Be careful when working in equipment bay during pressurization check.



PREFLIGHT CHECK (Continued)

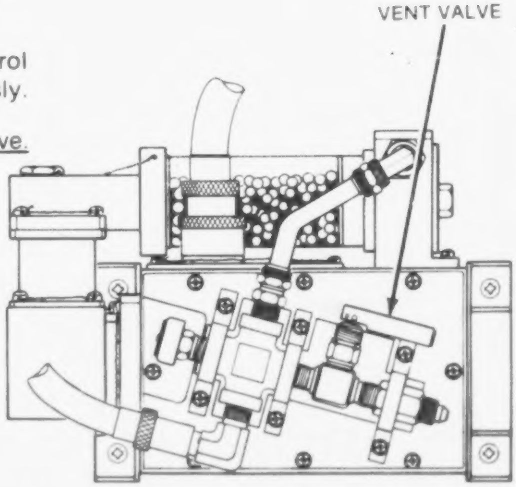
RF LEAK AND PRESSURIZATION CHECKS (Continued)

① Locate waveguide pump in aircraft No. 1 midsection equipment compartment. Set vent valve to open.

② In cockpit, verify that radar control RDY indicator blinks continuously.

③ Close waveguide pump vent valve.

④ Verify that radar control RDY indicator stops blinking within 5 minutes.



Closing Access Hatch Doors.

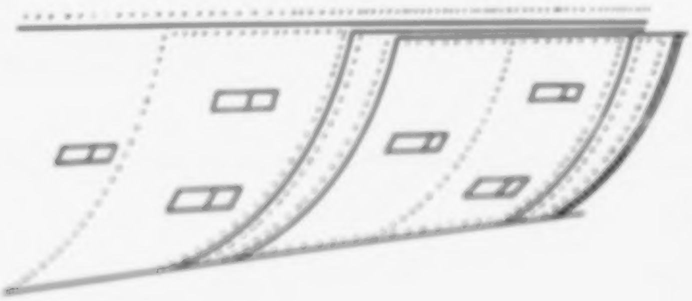
> **CAUTION**
>
> Be sure hatch doors fit flush with aircraft fuselage. Verify that each latch and snap fastener fits flush with doors. Failure to fit flush could cause accidental door opening during flight.

① Close access hatch door.

② While holding access hatch door shut, push each of the latches closed.

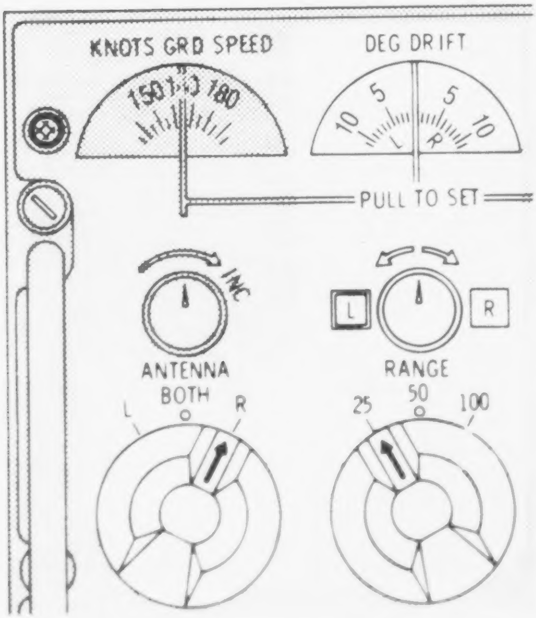
③ Engage each latch with its snap fastener.

④ Inspect each hatch door, latch and snap fastener. Be sure all fit flush with aircraft fuselage.



PREFLIGHT CHECK (Continued)

TRANSMITTER TEST


KNOTS GRD SPEED
150 160 180
DEG DRIFT
10 5 5 10
L R
PULL TO SET
INC
L
R
ANTENNA
BOTH
L
R
RANGE
25
50
100

① SETTINGS:

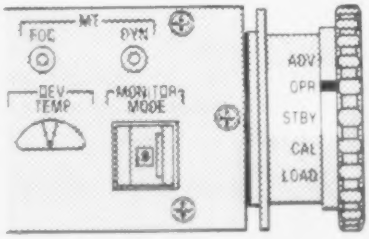
RADAR CONTROL

DEG DRIFT - 0°

ANTENNA - R

RANGE - 25

Recorder mode control to OPR.


MT
FOC
DYN
DEV TEMP
MONITOR MODE
ADV
OPR
STBY
CAL
LOAD

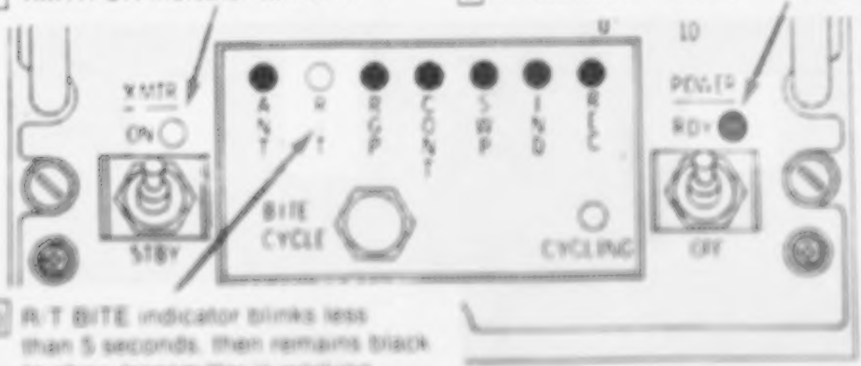
WARNING

BE SURE NO ONE IS NEAR THE SIDES OF THE ANTENNA BEFORE YOU TURN THE TRANSMITTER ON. DO THIS TEST IN AN AREA AWAY FROM OTHER TYPES OF RADARS.

② SET XMTR SWITCH TO ON.

1 XMTR ON indicator turns white.

2 POWER RDY indicator turns black.


XMTR
ON
STBY
ANT
R/T
RCP
CONT
SWP
IND
REC
BITE CYCLE
CYCLING
10
POWER
RDY
OFF

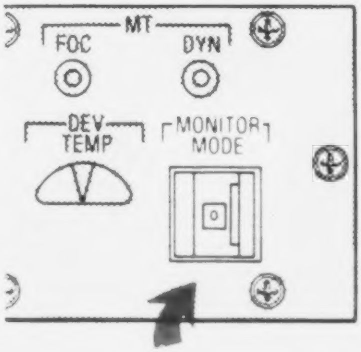
3 R/T BITE indicator blinks less than 5 seconds, then remains black to show transmitter is working.

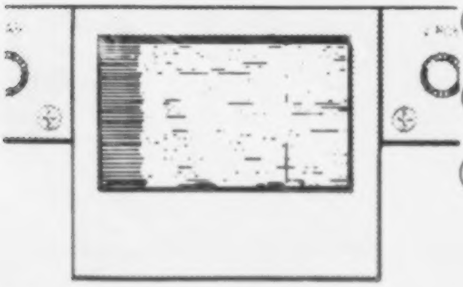
PREFLIGHT CHECK (Continued)

TRANSMITTER TEST (Continued)

NOTE

If R/T BITE indicator continues to blink white, or if XMTR ON indicator turns black, set XMTR switch to STBY and back to ON.



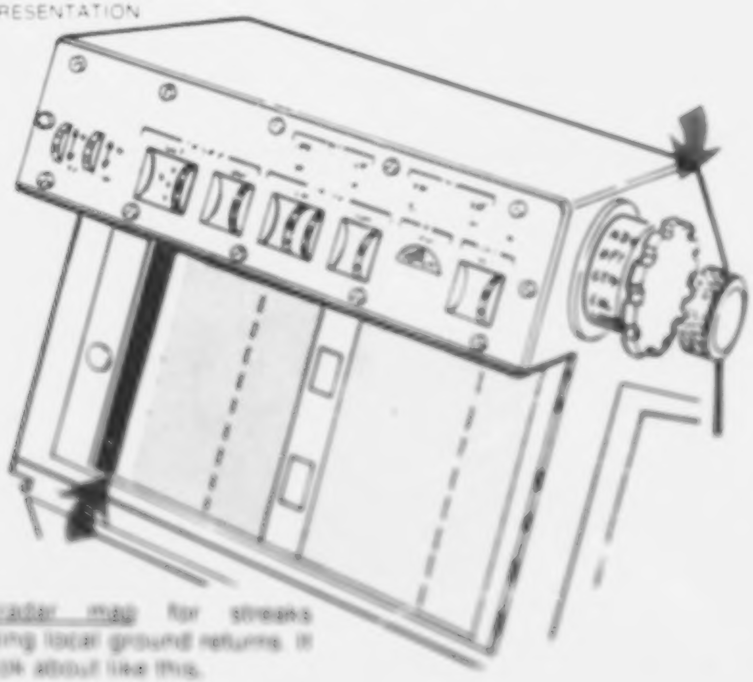


③ Set recorder MONITOR MODE switch to 0

④ Check monitor crt to see if radar signal imagery is present

⑤ After about 4 minutes operation set XMTR switch to STBY, and recorder mode control to ADV momentarily, then to STBY

MONITOR CRT PRESENTATION



⑥ Check radar map for streaks representing local ground returns. It should look about like this.

PREFLIGHT CHECK (Continued)

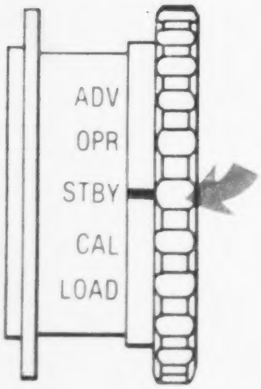
PREFLIGHT STOPPING PROCEDURES

① Set radar controls to the positions they should be in at the start of the mission.

② Turn off the ADAS and INS equipment.

③ Set radar control power switch to OFF.

④ Disconnect auxiliary power.

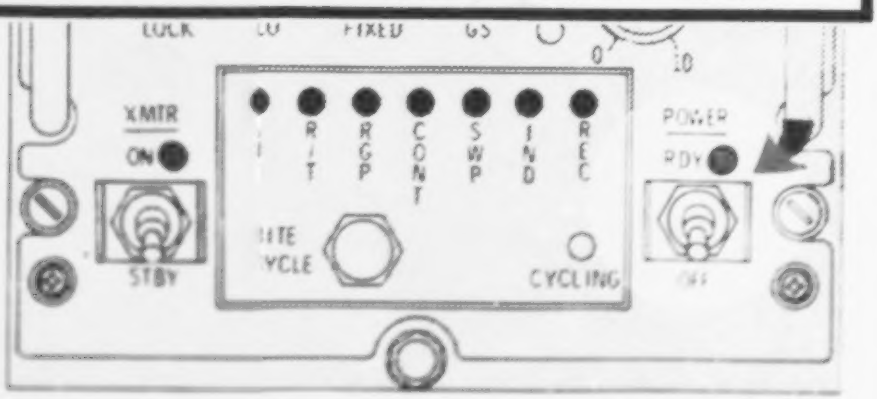

ADV
OPR
STBY
CAL
LOAD

NOTE

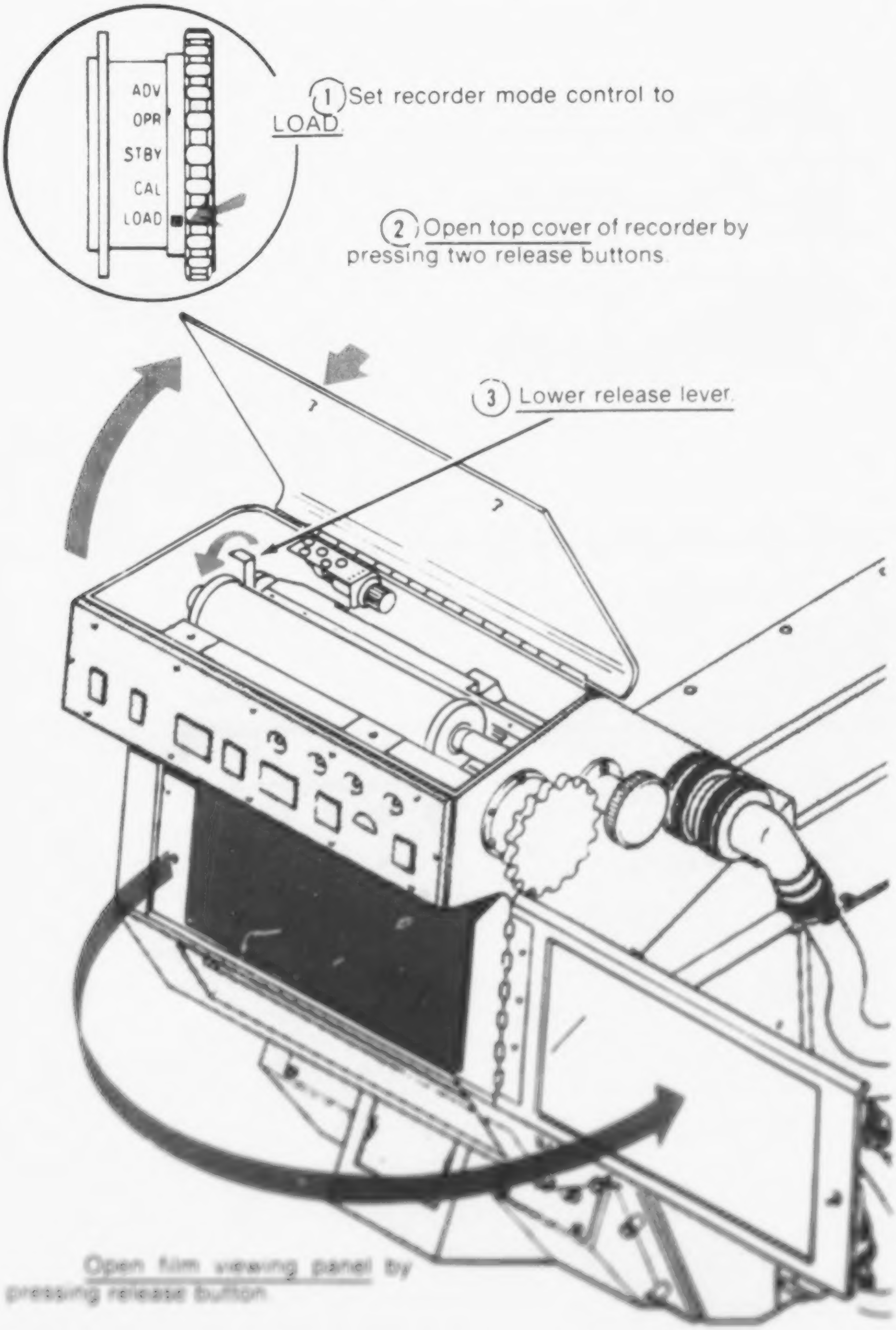
Remove film if:

(1) You will not startyour mission within 4 hours.

(2) Cockpit temperaures are expected to be very hot or very cold.


LOCK
LO
FIXED
GS
0
10
XMTR
ON
STBY
R I T
R G P
C O N T
S W P
I N D
R E C
TE
YCLE
CYCLING
POWER
RDY
OFF

EXPOSED FILM AND CASSETTE REMOVAL



① Set recorder mode control to LOAD.

② Open top cover of recorder by pressing two release buttons.

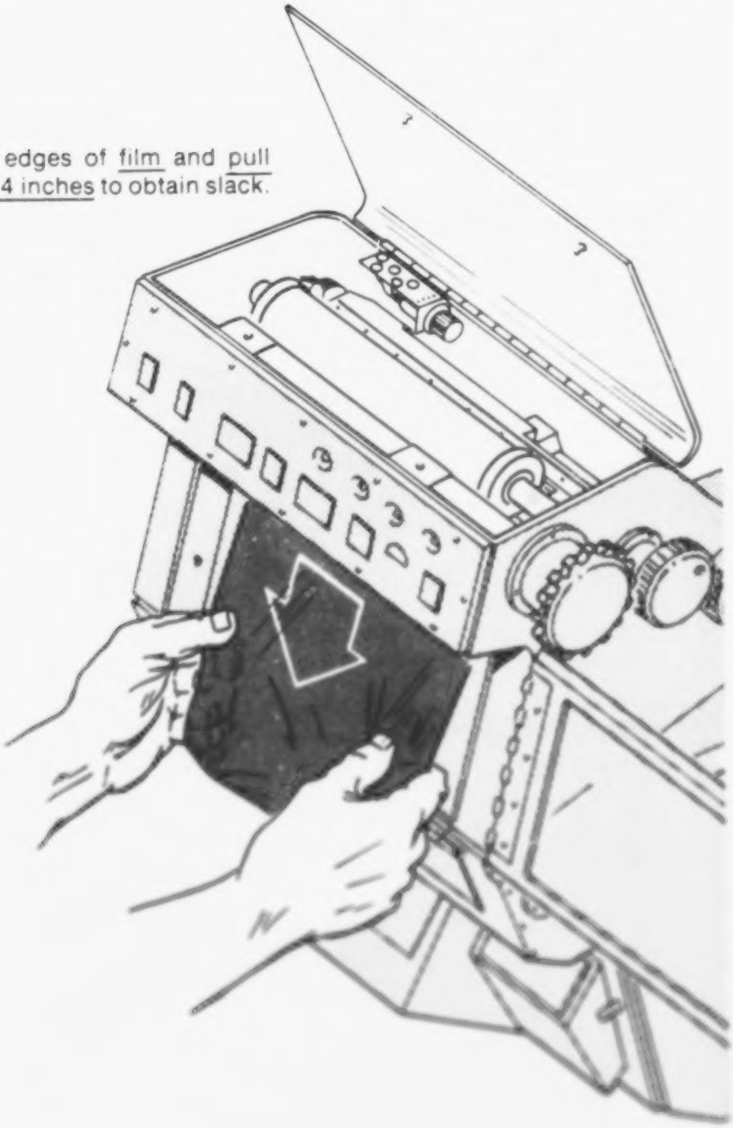
③ Lower release lever.

Open film viewing panel by pressing release button.

EXPOSED FILM AND CASSETTE REMOVAL (Continued)

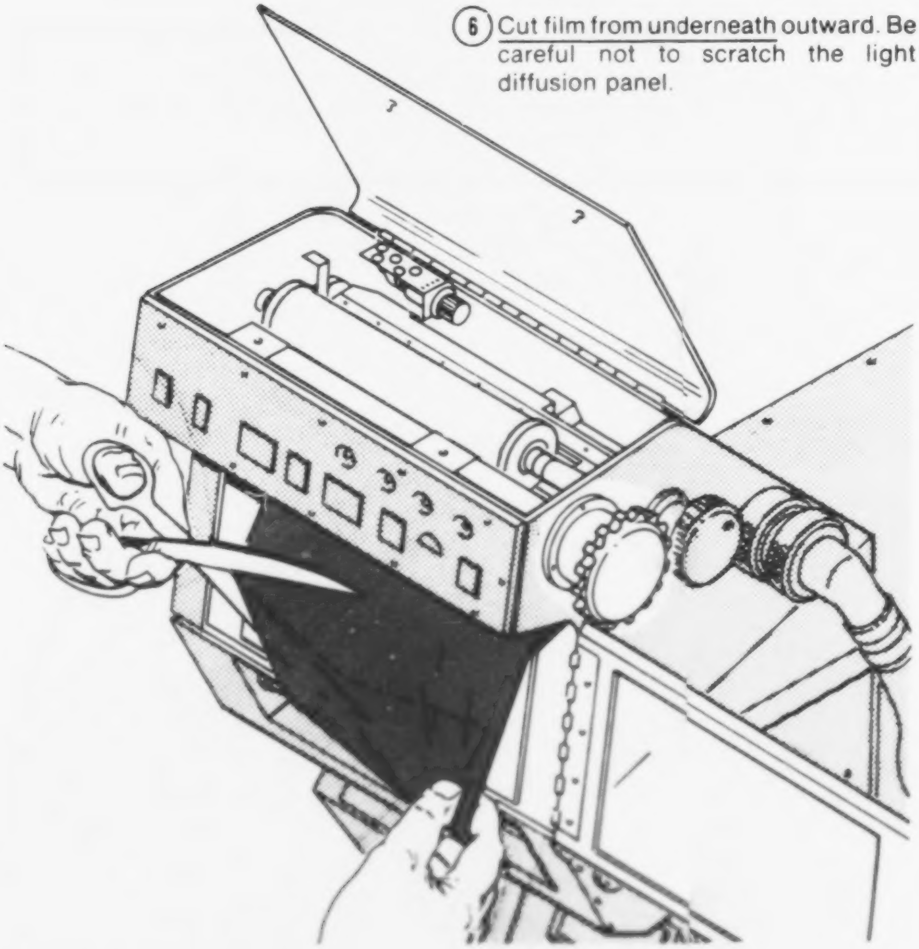
DO NOT PULL FILM UP FROM THE TAKEUP SPOOL WHEN GETTING SLACK. TO DO SO COULD DAMAGE THE TAKEUP GEAR ASSEMBLY

⑤ Grasp both edges of film and pull down about 4 inches to obtain slack.

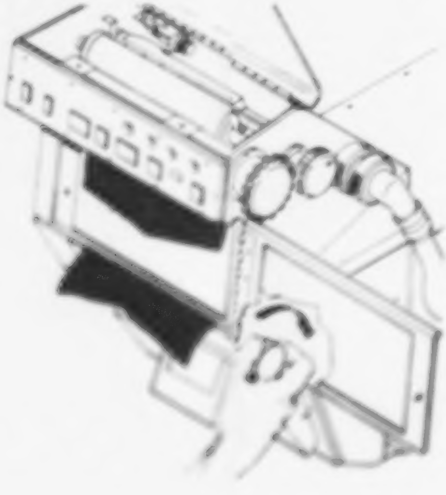


EXPOSED FILM AND CASSETTE REMOVAL (Continued)

⑥ Cut film from underneath outward. Be careful not to scratch the light diffusion panel.

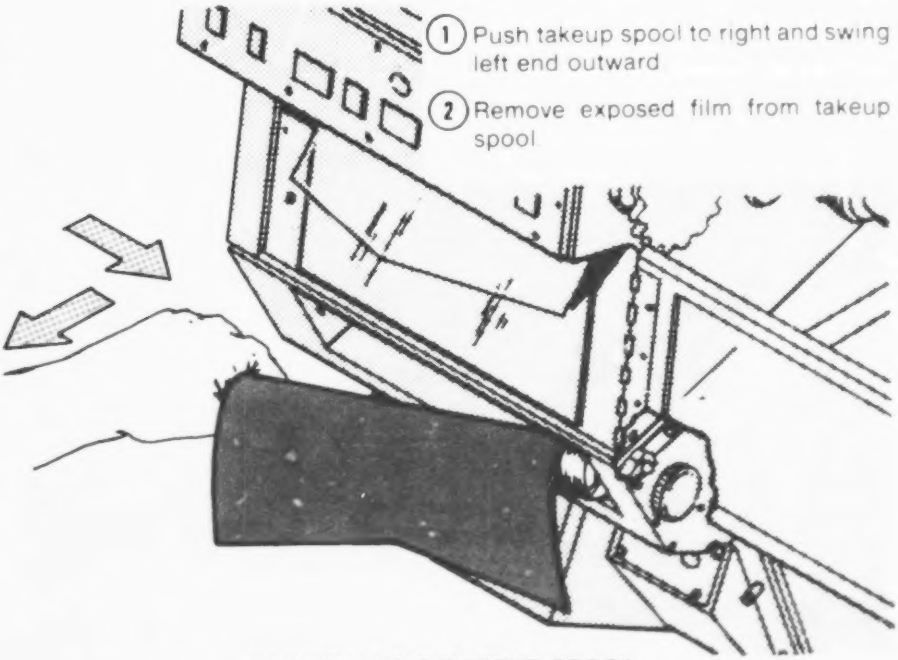


⑦ Wind exposed film onto takeup spool.



EXPOSED FILM AND CASSETTE REMOVAL (Continued)

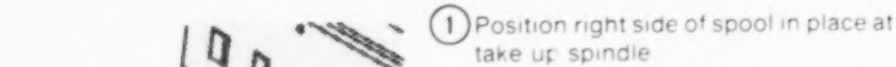
TAKEUP SPOOL REMOVAL



① Push takeup spool to right and swing left end outward.

② Remove exposed film from takeup spool.

REINSTALLING TAKEUP SPOOL



① Position right side of spool in place at take up spindle.

② Push spool lightly to the right while turning takeup knob clockwise. Continue turning takeup knob until spool locks into place on spindle.

③ Push spool to right and hold it there while putting left end into place over takeup pivot pin.

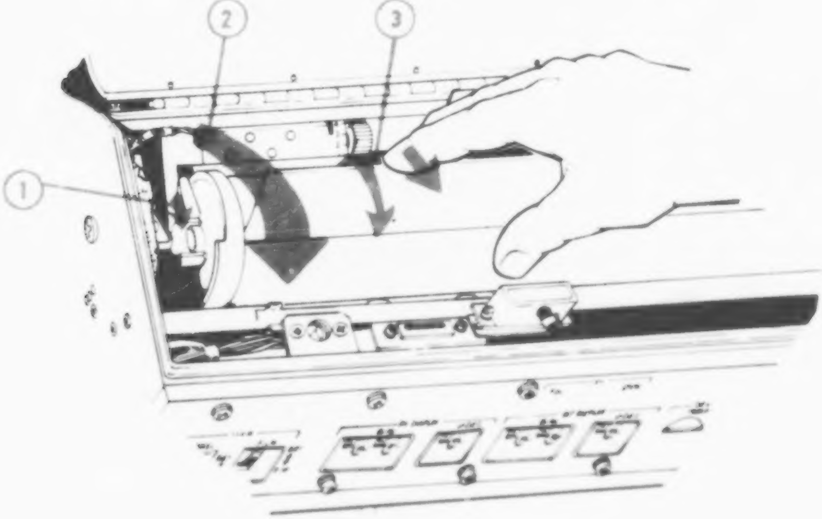
EXPOSED FILM AND CASSETTE REMOVAL (Continued)

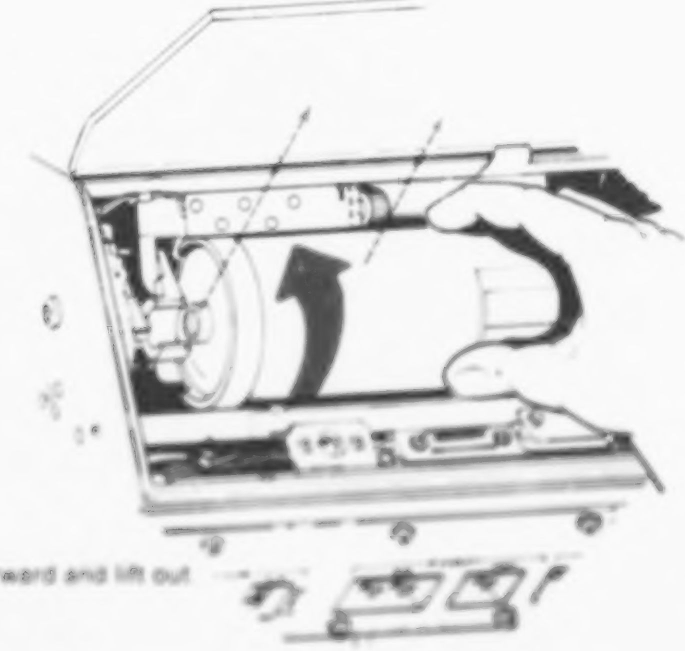
CASSETTE REMOVAL

① Lower release lever.

② Roll cassette back toward you to allow access to film.

③ Push film back into cassette until only about an inch protrudes.



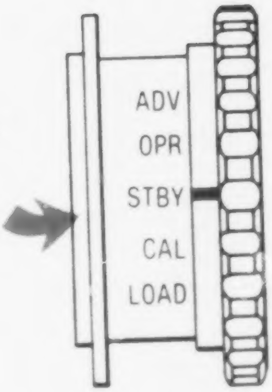


④ Roll cassette forward and lift out.

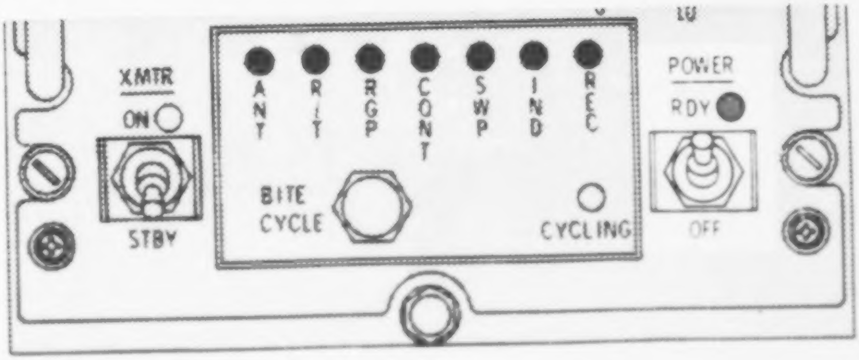
OPERATING PROCEDURES

STARTING PROCEDURE

① Set recorder mode control to STBY.


ADV
OPR
STBY
CAL
LOAD

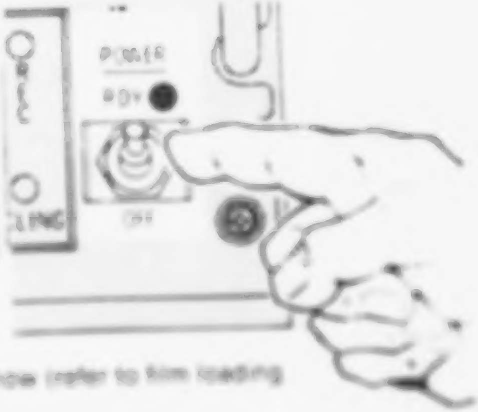
② Set POWER switch to RDY.


XMTR
ON
STBY
ANT
RIT
RGP
CONT
SWP
IND
REC
BITE CYCLE
CYCLING
POWER
RDY
OFF

③ Start INS and ADAS system (refer to applicable tech manuals)

NOTE

False BITE fails sometime occur at turn on. If a fail is indicated, press and release BITE CYCLE pushbutton. If a fail is still indicated after completion of BITE test, write it up and report it.


POWER
RDY
OFF

④ If film is not in recorder load it in now (refer to film loading procedures if needed).

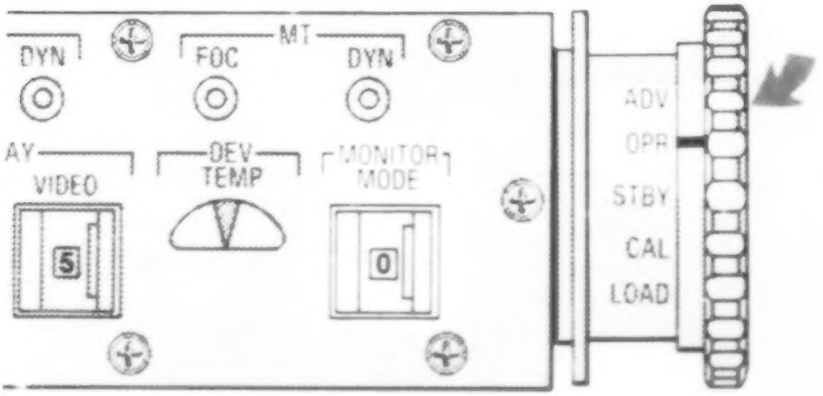
OPERATING PROCEDURES (Continued)

STARTING PROCEDURE (Continued)

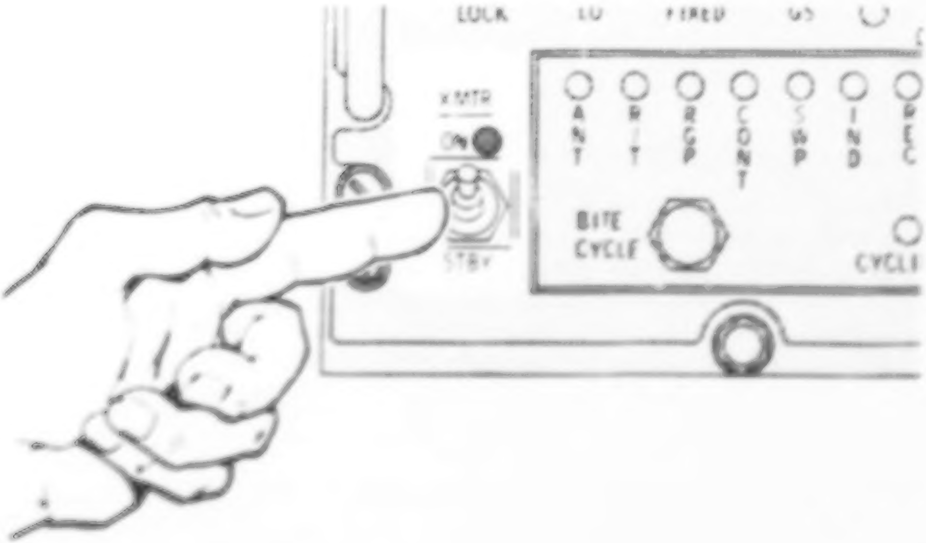
After Takeoff —

(!) SETTINGS

Recorder mode control — OPR. MONITOR MODE switch — 0.
Verify POWER RDY indicator is white (not blinking).

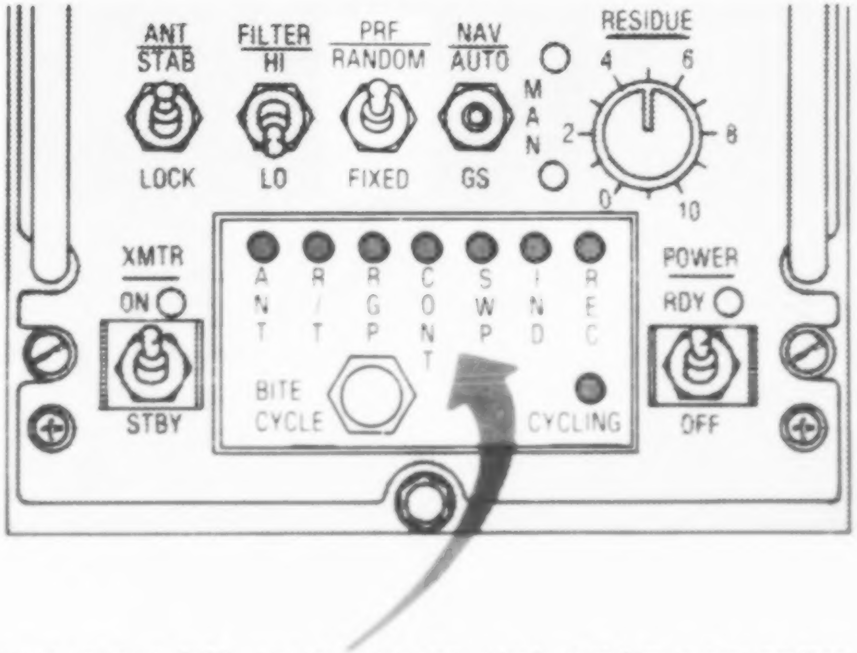

DYN
MT
FOC
DYN
AY
VIDEO
DEV TEMP
MONITOR MODE
5
0
ADV
OPR
STBY
CAL
LOAD

⑥ Set XMTR to ON. Verify that XMTR ON indicator turns white and POWER RDY indicator turns black.


LOCK
XMTR
ON
STBY
ANT
R/T
RCP
CONT
SWP
IND
REC
BITE CYCLE

OPERATING PROCEDURES (Continued)

STARTING PROCEDURE (Continued)


ANT
STAB
LOCK
FILTER
HI
LO
PRF
RANDOM
FIXED
NAV
AUTO
GS
MAN
RESIDUE
0
2
4
6
8
10
XMTR
ON
STBY
A N T
R / T
R G P
C O N T
S W P
I N D
R E C
BITE CYCLE
CYCLING
POWER
RDY
OFF

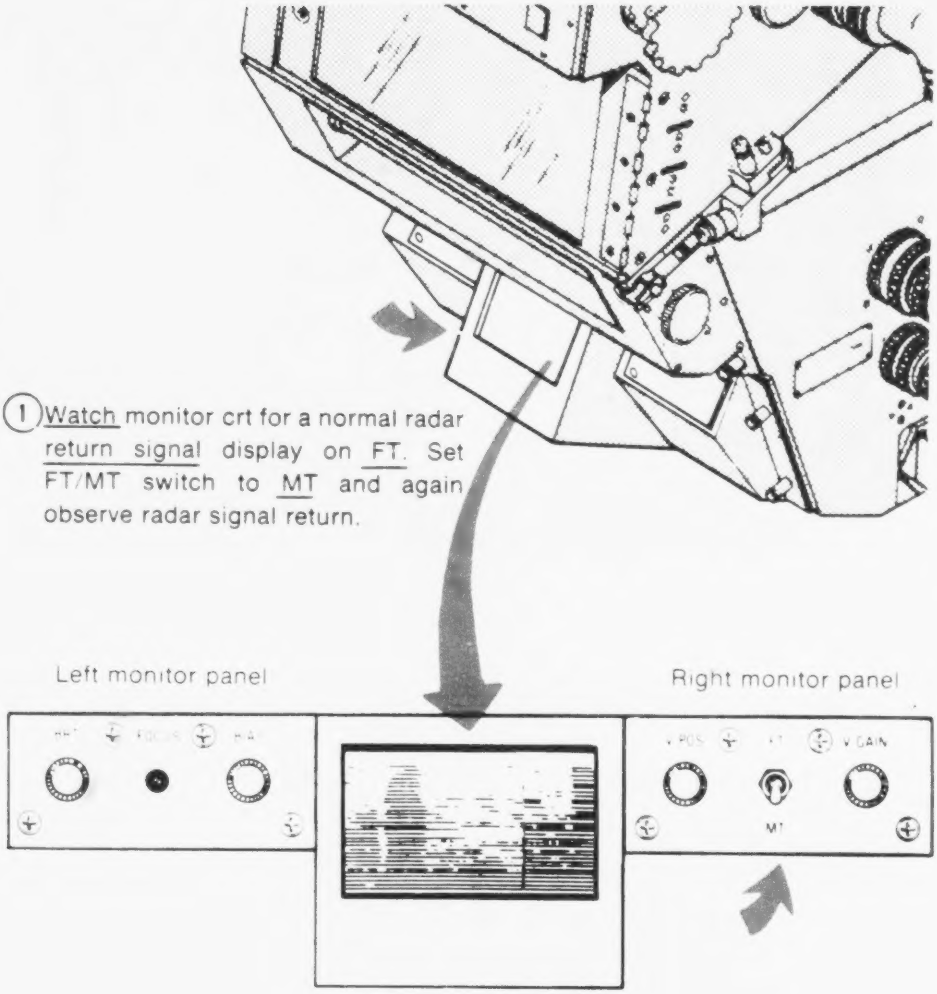
⑦ Verify that all BITE indicators are dark. Verify that film is moving through recorder and is being taken up properly at takeup spool.

⑧ Set PRF switch to RANDOM.

⑨ Set all SLAR controls to settings determined by mission requirements.

OPERATING PROCEDURES (Continued)

FINAL MAPPING PREPARATION


Left monitor panel
Right monitor panel
BRT
FOCUS
BIAS
V POS
FT
V GAIN
MT

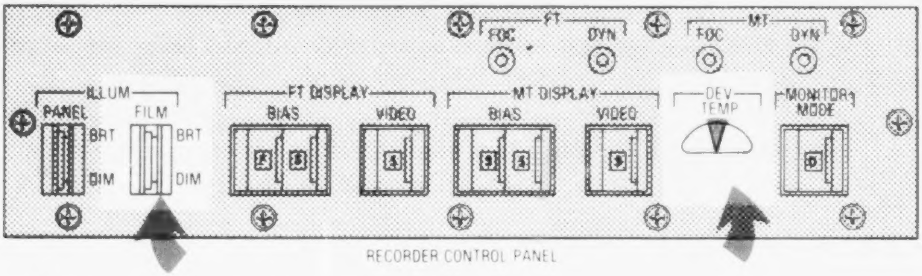
① Watch monitor crt for a normal radar return signal display on FT. Set FT/MT switch to MT and again observe radar signal return.

NOTE

The monitor crt signal constantly changes because the SLAR "looks" at a slightly different segment of terrain with each pulse. However, the normal monitor display will contain terrain video similar, in general, to that in the illustration.

OPERATING PROCEDURES (Continued)

FINAL MAPPING PREPARATION (Continued)

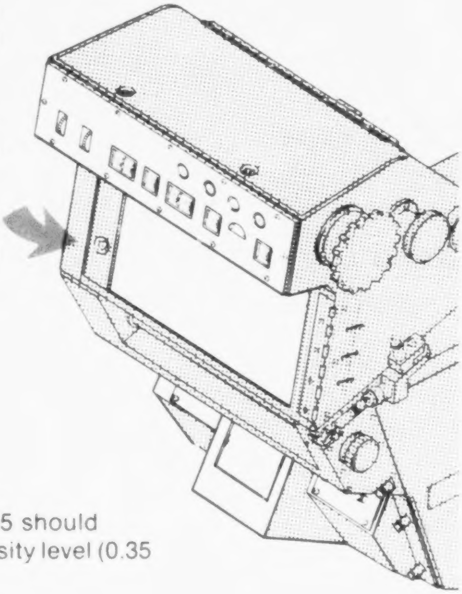

FT
FOC
DYN
MT
FOC
DYN
ILLUM
PANEL
FILM
BRT
DIM
BRT
DIM
FT DISPLAY
BIAS
VIDEO
MT DISPLAY
BIAS
VIDEO
DEV TEMP
MONITOR MODE

RECORDER CONTROL PANEL

② Adjust ILLUM FILM control to get desired illumination of film in viewing panel. Readjust as needed throughout the mission.

③ Verify that film is moving through recorder and is taken up at takeup spool.

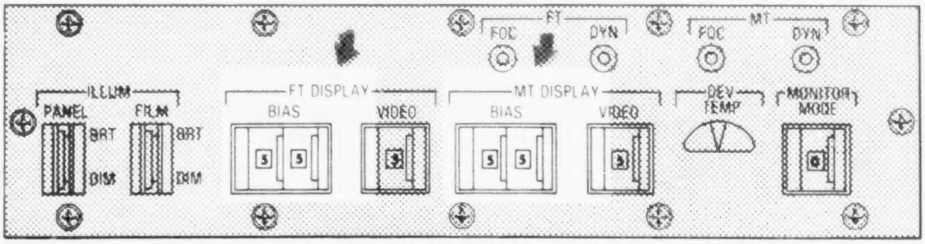
④ Check DEV TEMP meter. If pointer is not in green, wait until it is before proceeding.



SETTING BIAS

FT and MT DISPLAY BIAS settings of 55 should produce the proper film background density level (0.35 ±0.05).

Situations in which you may need different bias settings are discussed in Operation Under Unusual Conditions (page 2-68).


FT
FOC
DYN
MT
FOC
DYN
ILLUM
PANEL
FILM
BRT
DIM
BRT
DIM
FT DISPLAY
BIAS
VIDEO
MT DISPLAY
BIAS
VIDEO
DEV TEMP
MONITOR MODE
5
5
5
5
5
5
0

RECORDER CONTROL PANEL

best copy available

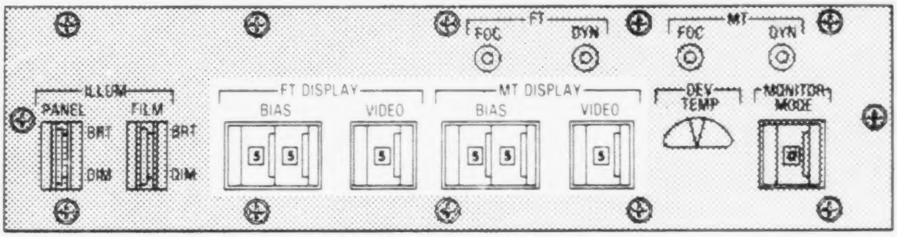
OPERATING PROCEDURES (Continued)

FINAL MAPPING PREPARATION (Continued)

SETTING VIDEO

In general, VIDEO is set properly when strongest returns appear black, yet do not cause blooming (blurring) of images. Weak returns will be light gray.

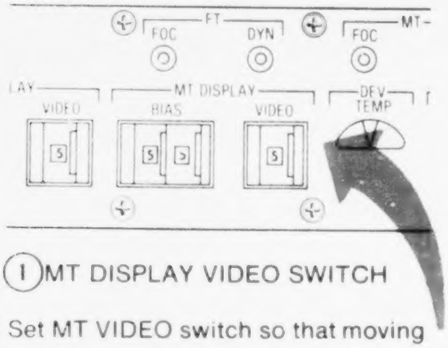
FT and MT DISPLAY VIDEO switches set to 5 normally produce good SLAR imagery. You may need to set it higher or lower, however, depending on terrain, or specific mission requirements. Refer to Operation Under Unusual Conditions (page 2-65).


FT
FOC
DYN
MT
FOC
DYN
ILLUM
PANEL
FILM
BRT
DIM
BRT
DIM
FT DISPLAY
BIAS
VIDEO
MT DISPLAY
BIAS
VIDEO
DEV TEMP
MONITOR MODE
5
5
5
5
5
5

RECORDER CONTROL PANEL

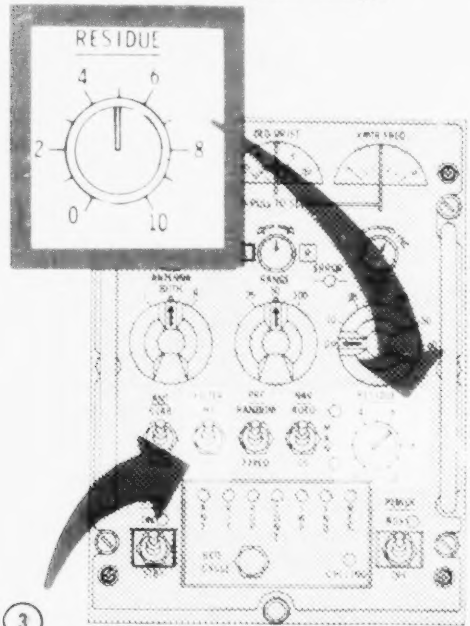
FINAL MAPPING PREPARATION (Continued)

SETTING MOVING TARGET PRESENTATION



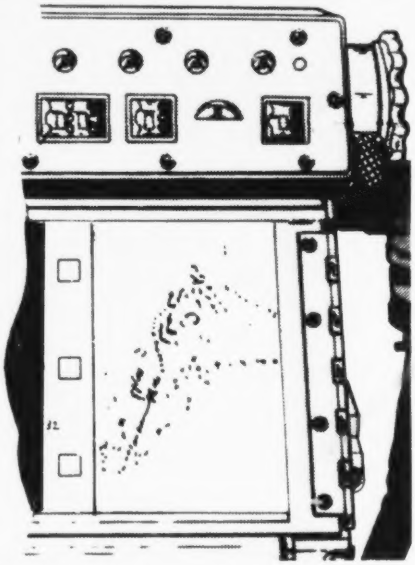
① MT DISPLAY VIDEO SWITCH

Set MT VIDEO switch so that moving targets show up clearly and distinctly. Moving targets should be dark, but should not bloom (appear fuzzy).



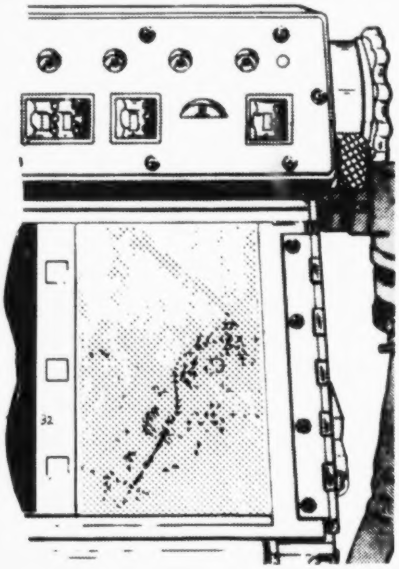
③ RADAR CONTROL FILTER SWITCH

Moving targets can be made to stand out more by setting FILTER switch to HI. However, keep in mind, that ability to detect slow moving targets is reduced when FILTER switch is set to HI.



② SETTING RESIDUE CONTROL

Adjust RESIDUE control to get just enough background (FT video) to allow you to pinpoint the location of moving targets easily.

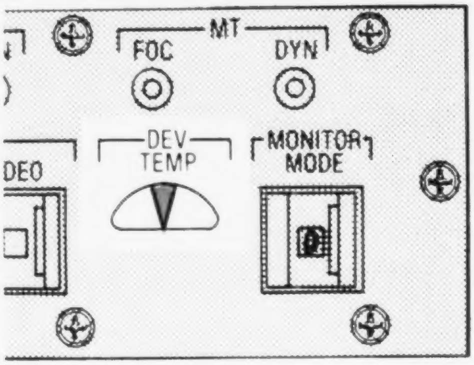


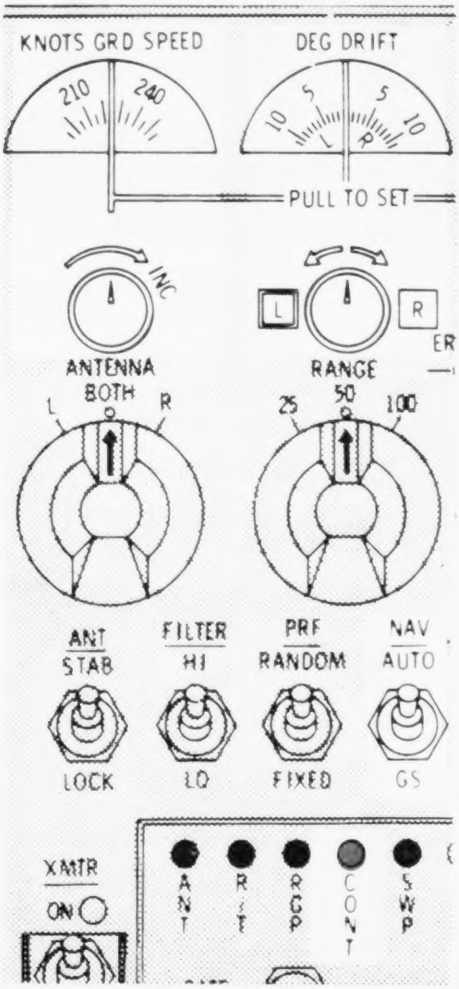
SOME THINGS TO REMEMBER DURING MAPPING

FILM DEVELOPING TIME LAG

Changes to aircraft ground speed and radar control RANGE and ANTENNA settings change film developing temperature. Allow up to one minute for heater bar to stabilize.

Be sure DEV TEMP needle is in green before starting each mapping run.


MT
FOC
DYN
DEO
DEV TEMP
MONITOR MODE


KNOTS GRD SPEED
210
240
DEG DRIFT
10
5
5
10
L
R
PULL TO SET
INC
ANTENNA
L
R
RANGE
ER
BOTH
L
R
25
50
100
ANT STAB
LOCK
FILTER HI
LO
PRF RANDOM
FIXED
NAV AUTO
GS
XMTR
ON
ANT
R/T
RCP
CONT
SWP

AIRCRAFT COURSE CHANGES

When radar control NAV switch is in AUTO, abrupt course changes cause temporary errors in DEG DRIFT and KNOTS GRD SPEED indications. It may take up to five minutes for these functions to be automatically updated.

To eliminate this delay:

① When track (mapping run) is completed, set XMTR to OFF.

② When all imagery from last track is visible in the viewing panel, manually set in new DEG DRIFT and KNOTS GRD SPEED.

③ Set XMTR to ON.

④ Resume mapping.

⑤ BITE CONT indicator may blink briefly from time to time.

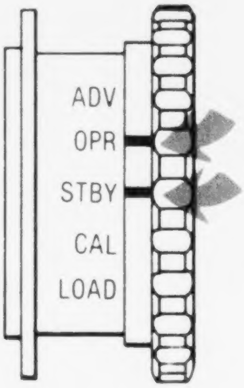
OPERATING PROCEDURES (Continued)

STANDBY PROCEDURE

If you stop mapping, but intend to resume later in the same flight, put SLAR in standby as follows:

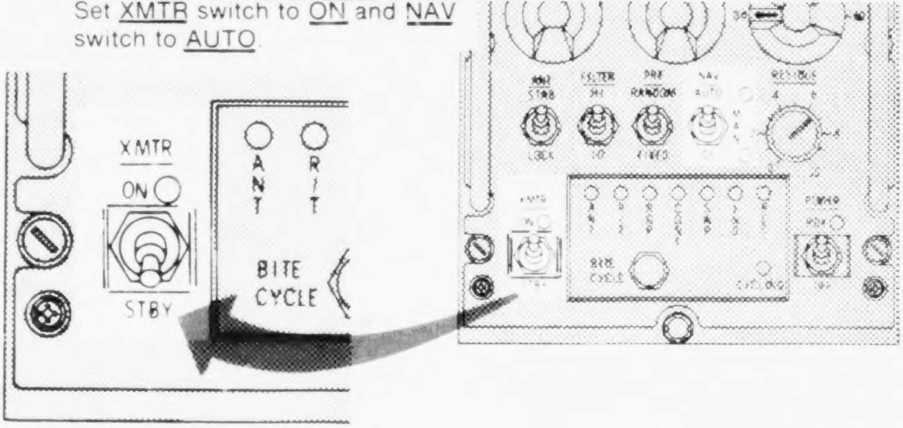
① Set radar control XMTR switch to STBY, and NAV switch to MAN.

② When end of imagery appears in viewing panel, set recorder mode control to STBY.



TO RESUME MAPPING

When you are ready to resume mapping, set DEG DRIFT and KNOTS GRD SPEED as required. Set recorder mode control to OPR. Set XMTR switch to ON and NAV switch to AUTO.



SHUTDOWN PROCEDURE

Shut down SLAR as follows:

① Set radar control XMTR switch to STBY, and NAV switch to MAN.

② When end of imagery appears in viewing panel, set recorder mode control to ADV. Leave in ADV until all film with radar imagery is wound onto film takeup spool. Set mode control to STBY.

③ Set radar control POWER switch to OFF.

④ Remove film using film removal procedure starting on page 2-30

FILM HANDLING AND SHIPPING PROCEDURE

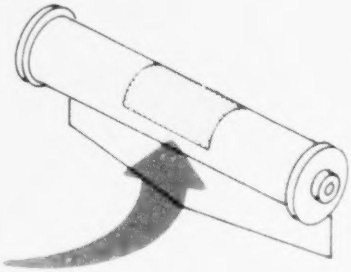
FILM HANDLING AND SHIPPING

Contains instructions for handling and shipping of unexposed SLAR (dry silver) film.

FILM STORAGE

NOTE

Expiration date on film cannister label is for film stored at 0° F. Film life is less when stored at higher temperatures, as below.



Film Storage Temperature	Remaining Life
0° F (-17.78° C (normal)	365 days
40° F (4.44° C)	109 days
72° F (22.22° C) (50% relative humidity)	55 days

New film cassettes. Store new unused, film cassettes at 0° F.

After preflight or between missions. Film storage will depend upon time before use, as below.

① Time to mission, 4 hours or less. Store at room temperature (about 72° F).

② Time to mission, 4-12 hours. Keep refrigerated (about 40° F). Remove film 3 hours before mission and store at room temperature.

③ Time to mission more than 12 hours. Store film at 0° F. Remove film 8 hours before mission and store at room temperature.

SHIPPING FILM

Shipping film. Ship unexposed SLAR film under temperature controlled conditions. Film should be shipped refrigerated (40° F, or below).

SECTION IV

OPERATION UNDER UNUSUAL CONDITIONS

OPERATION UNDER UNUSUAL OPERATING CONDITIONS

SLAR Will Not Come On — or Comes On, and Immediately Shuts Off.

① Check cockpit indicators — should read 115 volts ac and 28 volts dc.

② Make sure all cabling connectors are securely fastened.

SLAR Shuts Off While Operating.

XMTR ON goes black and RDY goes black—

This might be caused by abnormal line voltages or by overheating. Set XMTR switch to STBY and POWER switch to OFF. Wait 30 seconds, then perform normal startup procedure (recycle).

If problem persists, set XMTR switch to STBY and POWER switch to OFF. Do not operate SLAR until cause of problem has been corrected.

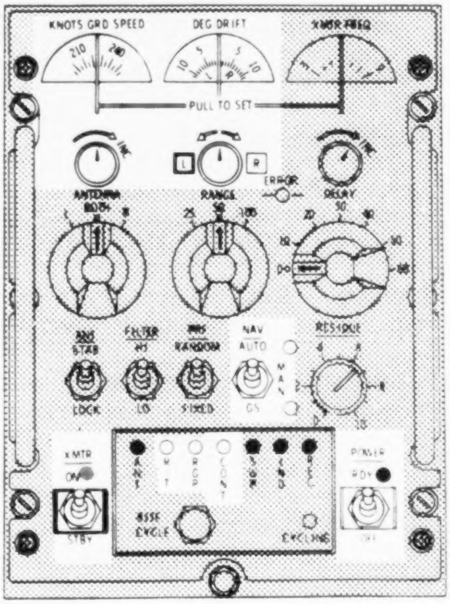
XMTR ON goes black and RDY goes white, Monitor scope shows no video at Monitor Mode "0"—

Set XMTR switch to STBY and then to ON. If problem persists, set XMTR switch to STBY and POWER switch to OFF. Do not operate SLAR until cause of problem has been corrected.

Signal Processor (RGP), or Receiver Transmitter (R/T) Fault.

① During preflight. Report fault to maintenance.

② During mission. Continue mapping until film imagery no longer meets mission requirements.



Radar Control (CONT) Fault.

① During preflight. Report fault to maintenance.

② During or immediately after aircraft course change. This is normal. See Aircraft Course Changes, in Section IV, page 2-62.

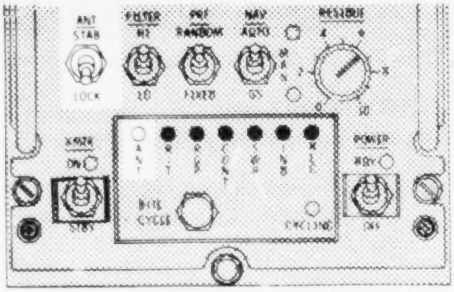
③ During mission (other than aircraft course changes.)

a. Your CONT fail may be due to missing drift or groundspeed inputs from INS. Set NAV switch to MAN position. Set in DEG DRIFT and KNOTS GRD SPEED information manually.

b. If CONT fault is not due to missing INS inputs, continue mapping. Stop mapping when SLAR fails to operate properly; or, imagery obtained no longer meets mission requirements.

OPERATION UNDER UNUSUAL OPERATING CONDITIONS (Cont)

Antenna (ANT) Fault.

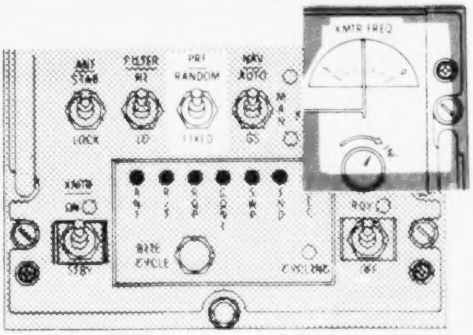

ANT
STAB
LOCK
FILTER
HI
LO
PRF
RANDOM
FIXED
NAV
AUTO
GS
MAN
XMTR
ON
STBY
BITE
CYCLE
CYCLING
POWER
RDY
OFF

① ANT fault detected during preflight or mission. If mission requirements permit, operate without antenna stabilization. To do so, set ANT switch to LOCK.

② ANT fault during turbulent weather. **This is a normal indication.** Leave ANT switch in STAB position

OPERATION THROUGH ELECTRONIC COUNTERMEASURES (ECM)

If effects of ECM are seen on radar map, do one or more of the following:


XMTR FREQ
ANT
STAB
LOCK
FILTER
HI
LO
PRF
RANDOM
FIXED
NAV
AUTO
GS
MAN
XMTR
ON
STBY
BITE
CYCLE
CYCLING
RDY
OFF

① Set MONITOR MODE switch to position 1. View the panoramic display on the monitor scope. Retune XMTR FREQ to move the frequency marker away from the interfering signal.

② Change aircraft course and repeat run.

③ Change aircraft altitude (last resort).

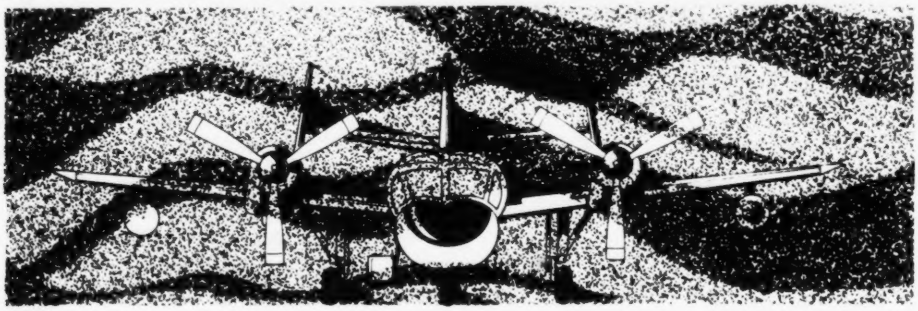
④ **Continue radar mapping as long as imagery obtained meets mission requirements.**

OPERATION UNDER EXTREME ENVIRONMENTAL CONDITIONS

Extreme Heat, Cold, or Moisture. Remove film cassette, and store in accordance with film handling procedures, section III, Page 2-64.

Salt Air and Sea Spray. Avoid exposing SLAR to these conditions.

Sandstorms or Dust Storms. Cover SLAR cockpit complex with cloth or plastic. Be sure all aircraft access doors, latches, and fasteners are securely closed.



OPERATION WITH UNUSUAL VIDEO (IMAGERY) REQUIREMENTS

VIDEO LEVEL SELECTION

This procedure is performed in-flight. It will help you determine the best video level setting for your particular mission. For best results, video selection sample should be of the area to be mapped.

Description. A sample of SLAR imagery is taken at four different video level settings. The start of each video level is marked by momentarily increasing the tens' digits of the BIAS switches. After examining each sample, you will select the video level that best suits your needs.

Video Level Selection Procedure.

NOTE

Be sure all SLAR controls are set per mission requirements before starting video level selection procedures.

① Set left (tens) digits of BIAS switches (FT and MT) to 6, then back to 5. Set VIDEO switches (FT and MT) to 2. Wait 1 minute.

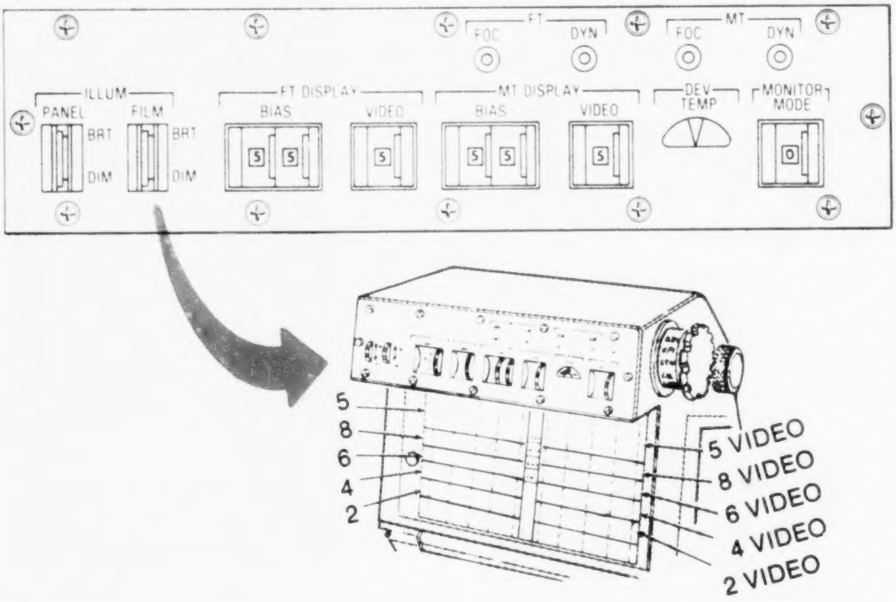
② Set left digits of BIAS switches to 6, then back to 5. Set VIDEO switches to 4. Wait 1 minute.

③ Set left digits of BIAS switches to 6, then back to 5. Set VIDEO switches to 6. Wait 1 minute.

④ Set left digits of BIAS switches to 6, then back to 5. Set VIDEO switches to 8. Wait 1 minute.

⑤ Set left digits of BIAS switches to 6, then back to 5. Set VIDEO switches to 5. When all of the sample imagery becomes visible in the viewing panel, set recorder mode control to STBY.

⑥ Examine each video level to determine the one that best meets your needs. If one level is too low, and the next is too high, set it for the level in between.


FT
FOC
DYN
MT
FOC
DYN
ILLUM
PANEL
FILM
BRT
DIM
BRT
DIM
FT DISPLAY
BIAS
VIDEO
5 5
5
MT DISPLAY
BIAS
VIDEO
5 5
5
DEV TEMP
MONITOR MODE
0
5
8
6
4
2
5 VIDEO
8 VIDEO
6 VIDEO
4 VIDEO
2 VIDEO

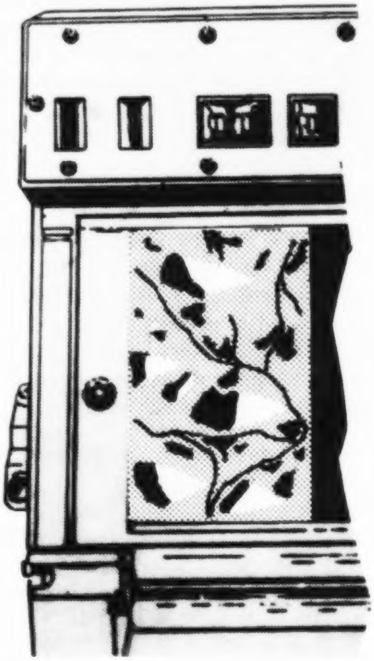
OPERATION WITH UNUSUAL VIDEO (IMAGERY) REQUIREMENTS (Cont)

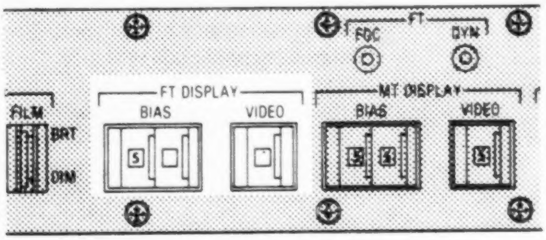
VIDEO AND BIAS SETTINGS FOR SPECIFIC REQUIREMENTS

LOW CONTRAST TARGETS:

Example: Roads or trails through jungles, woods or grassy areas.

Set VIDEO to highest level. Strong and moderate returns will be black. Differences in poor and weak (low contrast) returns will show up best. Reduce VIDEO to the lowest level that will bring out the low contrast targets you are looking for.





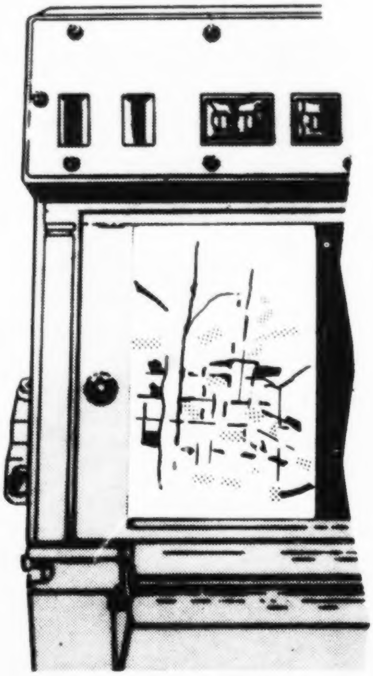
HIGH CONTRAST TARGETS:

Example: Industrial and other heavily populated areas.

If only high, strong, and moderate returns are important to you, and you need to be able to tell them apart:

1. Set FT BIAS to 52.

2. Set FT VIDEO to a level that will cause only the highest returns to be black. If highest returns are not black at the highest VIDEO level, increase FT BIAS until they are.



Under these conditions strong and moderate returns will be dark and gray respectively. Low returns will not show up. Your map will have a lot of clear areas, but it will contain the reconnaissance information you need.

CHAPTER 3

MAINTENANCE INSTRUCTIONS

Maintenance of the SLAR in this manual is limited to inspection, cleaning and changing film. Procedures for doing each of those is in Chapter 2.

LUBRICATION INSTRUCTIONS

The operator is not required to do any SLAR lubrication.

APPENDIX A

REFERENCE

The following is a list of applicable references that are available to the operator of the AN/APS-94F Radar Surveillance Set.

DA Pam 310-1	Consolidated Index of Army Publications and Blank Forms.
TM 30-245	Image Interpretation Handbook (NAVAIR 10-35-685; AFM 200-5.0).
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

APPENDIX B

COMPONENTS OF END ITEM LIST

Section I. INTRODUCTION

B-1. Scope

This appendix lists integral components of and basic issue items for the AN/APS-94F to help you inventory items required for safe and efficient operation.

B-2. General

This Components of End Item List is divided into the following sections:

a. Section II. Integral Components of the End Item. These items, when assembled, comprise the AN/APS-94F and must accompany it whenever it is tranferred or turned in. The illustrations will help you identify these items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the AN/APS-94F in operation, to operate it, and to perform emergency repairs. Although shipped separately packed they must accompany the AN/APS-94 during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII, based on TOE/MTOE authorization of the end item.

B-3. Explanation of Columns

a. Illustration. This column is divided as follows:

(1) Figure number. Indicates the figure number of the illustration on which the item is shown.

(2) Item number. The number used to identify item called out in the illustration.

b. National Stock Number. Indicates the National stock number assigned to the item and which will be used for requisitioning.

c. Part Number. Indicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items. Following the part number, the Federal Supply Code for Manufacturers (FSCM) is shown in parentheses.

d. ***Description.*** Indicates the Federal item name and, if required, a minimum description to identify the item.

e. ***Location.*** The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

f. ***Usable on Code.*** Not applicable.

g. ***Quantity Required (Qty Reqd).*** This column lists the quantity of each item required for a complete major item.

h. ***Quantity.*** This column is left blank for use during an inventory. Under the Rcvd column, list the quantity you actually receive on your major item. The Date columns are for your use when you inventory the major item at a later date; such as for shipment to another site.

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION		(4) LOCATION	(5) USABLE ON CODE	(6) QTY REQD	(7) QUANTITY	
(A) FIG NO.	(B) ITEM NO.		PART NUMBER	(FSCM)				RCVD	DATE
1-2, 1-3	UNIT 4	5895-01-062-8174	ANTENNA AS-3322/APS-94F SM-E-944831	(80063)	BOTTOM RIGHT FUSELAGE		1		
1-2, 1-3	UNIT 5	6625-01 046-1163	GENERATOR, SWEEP SG-1127/APS-94E SM-E-878175	(80063)	COCKPIT		1		
1-2, 1-3	UNIT 8	5841-00-140-7348	RACK, ELECTRICAL EQUIPMENT MT-4015/APS-94D SM-D-701210	(80063)	COCKPIT		1		
1-2, 1-3	UNIT 9	5841-00-143-4337	CONTROL, RADAR SET C-7645/APS-94D SM-D-701211	(80063)	COCKPIT		1		
1-2, 1-3	UNIT 10	5841-01 040-3872	RECORDER-PROCESSOR-VIEWER, RADAR MAPPING, RO-495/U SM-E-878155	(80063)	COCKPIT		1		
1-2, 1-3	UNIT 1	5841-01-070-4034	INTERCONNECTING BOX J-2794A/APS-94D SM-D-944988	(80063)	NO. 1 MIDSECTION EQUIPMENT COMPARTMENT		1		
1-2, 1-3	UNIT 13	5840-01 082-4065	ELECTRICAL EQUIPMENT PRESSURIZING SET HD-1067/APS-94F SM-E-945605	(80063)	NO.1 MIDSECTION EQUIPMENT COMPARTMENT		1		
1-2, 1-3	UNIT 11	5841-01 070-4064	RECEIVER-TRANSMITTER RADAR RT-1238/APS-94F SM-D-944833	(80063)	FORWARD BAGGAGE COMPARTMENT		1		
1-2, 1-3	UNIT 12	5841-01 061-2669	POWER SUPPLY - MOUNT PP-7508/APS-94F SM-E-944834	(80063)	FORWARD BAGGAGE COMPARTMENT		1		
1-2, 1-3	UNIT 3	5841-01 070-3860	PROCESSOR, RADAR SIGNAL CM-481/APS-94F SM-E-944832	(80063)	NO. 2 MIDSECTION EQUIPMENT COMPARTMENT		1		

SECTION III BASIC ISSUE ITEMS

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) LOCATION	(5) USABLE ON CODE	(6) QTY REQD	(7) QUANTITY	
(A) PAGE NO.	(B) ITEM NO.		PART NUMBER (FSCM)				RCVD	DATE
			TM11-5895-1078-10 RADAR SURVEILLANCE SET, AN/APS-94F					

APPENDIX C

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

C-1. Scope

This appendix lists additional items you are authorized for the support of the AN/APS-94F.

C-2. General

this lists identifies items that do not have to accompany the AN/APS-94F and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

C-3. Explanation of Listing

National stock numbers, descriptions, and quantities are provided to help you identify and request items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type document (i.e., CTA, MTOE, TDA, or JTA) which authorizes the item(s) to you. If the item you require differs between serial numbers of the same model, effective serial numbers are shown in the last line of the description. If item required differs for different models of this equipment, the model is shown under the "Usable on" heading in the description column. These codes are identified as:

Code	Used On

APPENDIX C

ADDITIONAL AUTHORIZATION LIST

(NOT APPLICABLE)

APPENDIX D

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. Scope

This appendix lists expendable supplies and materials you will need to operate and maintain the AN/APS-94F. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

D-2. Explanation of Columns

a. Column 1 — Item number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5 App. D").

b. Column 2 — Level. This column identifies the lowest level of maintenance that requires the listed item.

C — Operator/Crew

O — Organizational Maintenance/Aviation Unit Maintenance

F — Direct Support Maintenance/Aviation Intermediate Maintenance

H — General Support Maintenance

c. Column 3 — National Stock Number. This is the National stock number assigned to the item; use it to request or requistion the item.

d. Column 4 — Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by a par number.

e. Column 5 — Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION PART NO. AND FSCM		(5) UNIT OF MEAS
1	C	6505-00-105-0000	ALCOHOL, DENATURED UA00408		CN
2	C	6760-01-063-1597	CASSETTE, PHOTOGRAPHIC FILM LM-229A SM-A-878294	(80063)	EA
3	C	8305-00-205-3496	CLOTH, COTTON, LINT-FREE CCC-440		PK

LIST OF ABBREVIATIONS

ac	alternating current
APU	auxiliary power unit
BCD	binary coded decimal
crt	cathode ray tube
dc	direct current
ECM	electronic countermeasures
FT	fixed target
INS	inertial navigation system
MT	moving target
prf	pulse repetition frequency
rf	radio frequency

ACRONYMS

ADAS	Airborne data annotation system
BITE	Built-in-test-equipment
SLAR	Side looking airborne radar

GLOSSARY

NOTE

Words and terms in this glossary are defined according to their usage and applicability to the SLAR and this manual.

Arcing (spark) — Electrical discharge across a gap, within a waveguide, or between electrodes.

Drift angle — Difference between an aircrafts true heading (line-of-flight) and apparent heading (direction aircraft is pointing). The proper drift angle will compensate for effects of prevailing winds.

Filter — Electronic circuit that selects out that part of return radar signal caused by moving targets of interest.

Fixed target (ft) — Targets that do not move in relation to the ground. The map containing only fixed (stationary) SLAR imagery.

Ground speed — Speed of aircraft in relation to ground.

Line-of-sight — In direct view, with no obstacles in between.

Moving target (mt) — Targets that move in relation to the ground. The radar map containing moving targets.

Pitch — Up and down, nose-to-tail rocking of aircraft due primarily to air turbulence.

Residue — The fixed target (ft) imagery appearing on the moving target (mt) map, used to help define location of moving targets.

Roll — Wingtip-to-wingtip vertical rotation of aircraft normally occurring in turns and turbulent weather.

Sweep (trace) — Line across face of crt caused by movement of electron beam.

Target — Any object or feature in the area being mapped.

Waveguide — Enclosed channel for passage of rf energy.

Yaw — Side-to-side pivoting of aircraft due primarily to air turbulence.

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PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 11-5840-340-12	23 Jan 74	Radar Set AN/PRC-76

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PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
2-25	2-28			Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°. REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure the the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		F03		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

SAMPLE

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